

# The Canadian Medical Association Journal



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# The Canadian Medical Association Journal

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## PARATYPHOID IN THE ARMY AT THE DARDANELLES \*

By E. N. COURTTS, M.D.,

*Lieutenant R.A.M.C.*

THE object of this article is to give a brief clinical picture of paratyphoid fever as it has existed in the army at the Dardanelles. This picture is modified in some cases by the concurrence of other infections that exist in this region, especially of the enteric infections, amebic and bacillary dysentery, trichomonas, and vibrios; and of malarial fever.

The number of cases of paratyphoid A. and B. bacteriologically diagnosed, that these observations are based upon is about equal, sixty-six of the former and sixty-three of the latter. The majority of the cases of paratyphoid B. occurred in the hot summer months, when the fly was ubiquitous, and dysenteric infections frequent. Most of the cases of paratyphoid A. occurred in November and December, when these infections had greatly diminished. Hence it is paratyphoid B. that has been modified by them, and chiefly in inducing more severe and protracted diarrhoea. Eight cases of paratyphoid fever have been included, in which the bacilli isolated possess the cultural characteristics of paratyphoid, especially of paratyphoid B., but do not agglutinate with the sera of either paratyphoid A. or B. They are not distinguishable clinically from other paratyphoids. Neither is it possible with any assurance to distinguish clinically paratyphoid A. from paratyphoid B.

The bacteriological diagnosis was determined by blood culture in ninety cases; by isolation of the organism from the faeces in

\*Illustrative charts and summary of case reports for thirty-four cases were appended to this article. It has been possible to publish only three of the charts and a limited number of cases.—Ed.

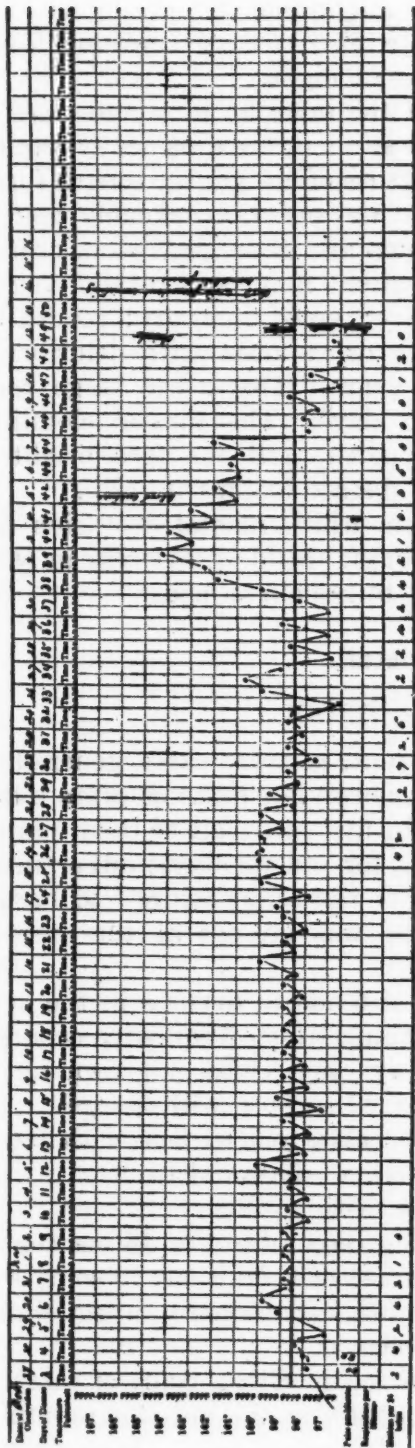
twenty-four cases; and by serum agglutination in twenty-four cases. Some of the paratyphoids arrived in hospital too late for successful blood culture, as it was only in the early stage that the organism could be isolated from the blood, generally within the first ten days. In such cases the stools were examined; or the agglutination test was done after the temperature became normal. In one case bacillus paratyphoid A. was isolated from the faeces in the third week, the patient still running a temperature, blood taken on the same day being negative in its agglutination test. After the stools became formed the organism was not so readily obtained, even after purging, as from the fluid stools of persistent diarrhoea. The agglutination requirements were positive and complete agglutination in dilutions not less than 1:100, with a time limit of one hour.

Paratyphoid fever resembles typhoid fever so closely that without the guiding aid of bacteriological investigation the majority of cases occurring here might have been diagnosed as typhoid, and the milder type of the disease attributed to the protective power of inoculation. Ninety-five per cent. of these cases occurred in persons previously inoculated against typhoid and most of the typhoid cases occurred in uninoculated persons. By the bacteriological determination of the disease in individual cases it has been possible to group its symptoms, and to note the features which distinguish it from typhoid and other diseases. It is difficult to overestimate the immense importance to the Army, especially in these regions of tropical disease, of skilled bacteriologists, such as we have been most fortunate in having in Mudros East.

Paratyphoid fever resembles typhoid in its general outline and features. It differs in some of its details, and in its shorter and less virulent course. Its onset is often definite or abrupt. It was relatively so in 60 per cent. of these cases. In typhoid the onset is more rarely abrupt. Paratyphoid tends to reach the acme of its acuteness more speedily; and relaxes its grip again more readily. Typhoid as a rule shows greater steadiness and insistence. Paratyphoid may present a similar chart, but rarely pursues its course so long, with so little variation. It weakens and recedes, and renews its attacks again with lessened vigour. Hence remissions and intermissions in temperature appear earlier, and are more marked and frequent in paratyphoid. The mortality in these cases was about 4 per cent.

The patient may be suddenly overwhelmed while on active duty, with shivering, severe headache, dizziness, and weakness.

CHART I.—PARATYPHOID A. ATYPICAL



Illustrating Case 3. Note the long period—upwards of five weeks—between the onset of the disease and the acute exacerbation which terminated fatally. The bacillus was isolated from the blood on the seventh day after the onset.

Other symptoms follow: nausea or vomiting, abdominal pain or diarrhoea; aching of the back or limbs. The attack may begin in the night, the patient awaking feeling ill. In cases of less severe onset it may yet be quite definite in point of time. Previously quite well, on rising in the morning he has lost desire for food, feels tired, chilly, has some headache or other symptoms, but continues on duty for a varying period of time, and may even improve temporarily to yield later on to the disease. Occasionally the body contends for many days or weeks with the disease on almost equal terms, to succumb in the end to a final acute exacerbation, e.g. Cases 3 (See Chart I) and 4. In many other cases the onset is as insidious and gradual as it ever is in typhoid fever, Cases 10 and 26.

The rise of temperature may be sudden, reaching 103° within a few hours, in correspondence with the abruptness of the acute symptoms—Case 12; or gradual, extending over several days or a week in step-ladder style until the patient feels ill—Case



5. On the other hand the patient may report in morning with sub-normal temperature, feeling quite ill. It may continue low in the morning for some days, rising at night.

With the full development of the invasion in severe cases the face is generally flushed, it may be swollen; the eyes heavy, perhaps injected; the expression dull; the breath offensive; the tongue furred, sometimes enlarged, moist or dry; the pulse occasionally dicrotic. There may be headache or diarrhoea and abdominal pain, or backache. In a few days more the patient may be mentally sluggish or incoördinated; memory defective; voice unsteady; mouth and throat dry; occasionally delirious or haunted with delusions or fears. He looks older than his years. This acute stage rarely lasts longer than a week or ten days. The mental cloudiness diminishes; the tongue becomes moist, and the face brightens; the temperature vacillates as the disease loosens its grip.

Moderate cases are frequent in which mental confusion does not occur, and the acute stage is brief. Mild cases occur in which the patient does not feel disposed to remain in bed.

#### Consideration of symptoms in detail.

##### DIGESTIVE SYSTEM

*Vomiting* occurred in 26 per cent. of these cases, generally at the onset; occurring either spontaneously, or quite as often indeed by the taking of food or drink. In five cases, all of them paratyphoid A., it was severe, persisting for several days; either in the course of the severe period, or after the temperature had become normal. Nausea without vomiting was present at the onset in 9 per cent.

*The tongue* is coated early, and tends to dryness in the acute stage, especially with mouth breathing which frequently occurs in severe cases. It may have a heavy grey white or brown fur, or may present a baked, scaly, or crushed surface, with fissures. The fur may be general or patchy—a central red surface with lateral strips; or a general coating with clean edges and tip.

*The teeth* are prone to coating with sordes.

*The throat* is often dry causing discomfort; in 13 per cent. it was sore, generally in the early course of the illness; in some with little change in appearance; in others markedly injected and swollen. The tonsils were not swollen.

*Diarrhoea*, mild or severe, occurred in 80 per cent. of cases, as a rule in the first week, not infrequently as the initial symptom of onset, and often associated with abdominal pain. It sometimes

was very mild, and lasted only one or two days. There might be one liquid stool one day, then constipation for several days, followed by one or more liquid stools without laxative. The diarrhoea frequently continued into the second or third week, and occasionally much longer.

It was the initial symptom in nineteen cases, sixteen of them paratyphoid B., two paratyphoid A., and one paratyphoid X., preceding the other symptoms of onset by periods varying from one to three days to one to three weeks. To illustrate: Case of Private T——. Diarrhoea, worse at night, with four or five liquid stools daily, continued until sudden onset of acute symptoms one week later; admitted then to hospital; bacillus paratyphoid B. isolated from the blood; diarrhoea began to diminish soon after admission.

Case 2, Private J——. Diarrhoea began September 3rd, while in hospital, four to six liquid stools daily, kept getting quite weak; September 17th, onset of headache, dizziness, chilliness, vomiting, pain in back. Bacillus paratyphoid B. isolated from blood.

Nine of these cases of initial diarrhoea were uncomplicated. Six others had amœbic dysentery prior to the onset of paratyphoid, and were convalescent, or partially so,—perhaps several semi-formed stools obtaining daily. In none of these cases did the character of the paratyphoid diarrhoea appear to be measurably altered by the preceding dysentery, either in the length of its period, or its severity. It is possible that the damage to the intestine by the dysenteric organisms may have rendered it more susceptible to the initiation of diarrhoea by the paratyphoid organism.

In one case trichomonas and vibrios were discovered in the stools in addition to bacillus paratyphoid B. The diarrhoea was prolonged and exhausting, but no more so than in one of the uncomplicated cases. By uncomplicated one means that no other known diarrhoea-producing organism was discovered in the fæces than bacillus paratyphoid. One could not conclude with certainty that this organism was alone concerned in causing this diarrhoea, although it appeared probable.

In two cases of diarrhoea admitted to hospital the fæces were examined for dysentery. None of the dysentery-producing organisms were found, but bacillus paratyphosus B. was isolated by Mr. Logan, and within a few days the temperature course and clinical symptoms of paratyphoid began to develop.

The special symptoms of paratyphoid B. were probably partly seasonal in cause. Although more frequent as an initial symptom in paratyphoid B., diarrhoea occurred in paratyphoid A. in a greater percentage of cases, and in some of them with marked severity, and nearly always in the first week of illness. It is interesting to note that in a case of perforation by paratyphoid A. there was only constipation.

*Dysentery* occurred in fourteen of the whole series of cases; in two of them concurrently with the paratyphoid, giving rise to very severe and serious illness; in twelve either preceding or following the paratyphoid illness or both, giving rise also in some cases to an exhausting illness. Vibrios were also found present in several of the more severe of these cases.

*Abdominal pain and tenderness* occurred in nearly 70 per cent. generally as symptoms of onset, or in the first week of illness, and frequently associated with diarrhoea. Sometimes the patient would be seized with abdominal pain, and at the same time, or in a few hours, or next day, diarrhoea would occur. Sometimes it was present only prior to evacuation of the bowels, and relieved thereby. In some it was mild and transient; in others it dominated the situation during the first or second week along with the diarrhoea. After the first or second week it was seldom troublesome. It affected any part of the abdomen, being most frequent in the upper zone. Tenderness lasted longer than pain, and was most frequent in the epigastrium.

*Hæmorrhage* occurred in four cases, two paratyphoid A., and two paratyphoid B.; one slight, with blood well mixed with fæces, the others severe; all in the second week of illness.

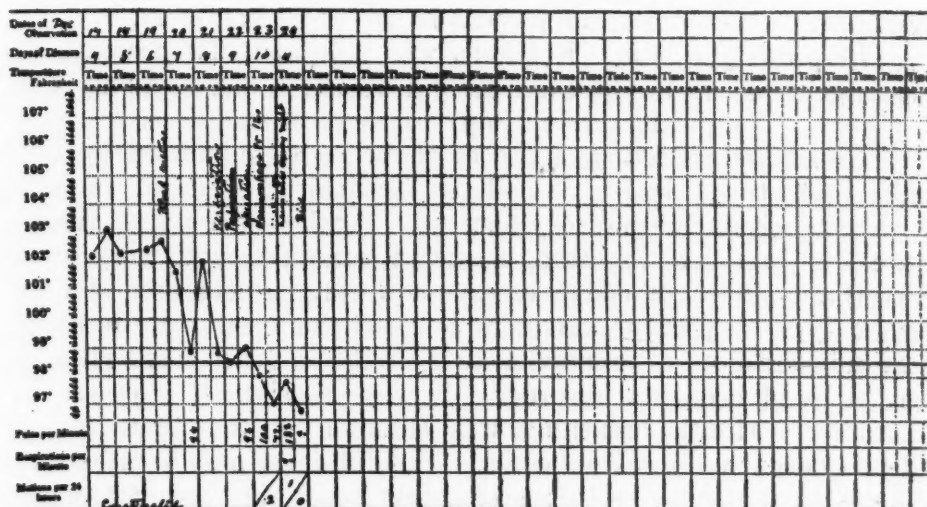
*Perforation* occurred in two cases, one paratyphoid A. in the eighth day of illness. Operation revealed two perforations in the lower ileum, and a third ulcer almost perforated. This patient was admitted on the fourth day of illness, and suspected to be a case of appendicitis. He had no diarrhoea. After operation he had repeated severe hæmorrhages which hastened his death. (See Chart II).

The other perforation was in a case of paratyphoid B. on the twenty-eighth day. Post mortem revealed the perforation in the descending colon, with several healed ulcers near it. Peritonitic adhesions were present in the abdomen. Bacillus paratyphoid B. had been isolated from the blood. Examination once of the fæces for dysentery organisms was negative.

*Abdominal distension* was not a marked feature. There was



CHART II.—PARATYPHOID A, WITH PERFORATION



Illustrating Case 24. Death occurred from repeated hæmorrhages two days after operation for perforation.

frequently some fulness of the abdomen, and sometimes a marked distension with the severe abdominal symptoms of the early acute stage.

*The spleen* was palpable in about 45 per cent. of the cases.

There was never any evidence of trouble in the gall bladder.

*Hepatitis* occurred in one case during convalescence, with chills and high flights of intermittent temperature, enlargement and marked tenderness of the liver. It was probably amœbic in origin, and yielded to prompt and vigorous treatment with emetine.

*Circulatory system.* The pulse is slow relative to the temperature, as in typhoid. To illustrate: a pulse of 93 with temperature of 103°, pulse of 100 with temperature of 104°, pulse of 68 with temperature of 103° were observed.

The first heart sound was frequently softened; the pulmonary sound accentuated. A systolic murmur was not infrequent; perhaps existing prior to illness in some cases. It was sometimes loudest near the sternum. In several patients the heart was broadened to percussion, the pulse quickened, and the patient detained in bed during convalescence because of the cardiac deficiency.

*Anæmia* was quite marked in twenty-five of these cases in convalescence. It was relatively more frequent in those who had suffered from protracted diarrhoea, with other enteric infections. It was very marked in three cases with concurrent malaria. Even

in uncomplicated cases, however, anæmia was occasionally pronounced. Leucopænia was present in the cases examined.

*Respiratory system.* Epistaxis was present in 20 per cent. of cases, generally in the first and second weeks; in one case only was it severe. Cough was present in 47 per cent. of the cases.

*Bronchitis* existed in many of these cases, evidenced by dry râles, sometimes moist. Capillary bronchitis occurred in one with cyanosis and respiratory distress. Patches of impaired resonance, and bronchial breathing occurred sometimes with very little disturbance, without cough or expectoration. Pneumonia of very severe type may occur and help to close the scene. Respiration was quickened out of proportion to the pulse in acute cases without any signs of bronchial disorder. It was occasionally irregular in character. Mouth breathing was common in the acute stage. Pleurisy occurred in several cases. The pulse was only occasionally dirotic in the acute period; later it was small and very compressible.

*Fever.* The temperature may rise abruptly to 102°-104° as in Case 12; or ascend by gradations through a period of two or three days to a week or longer. It maintains itself at this high level with moderate daily remissions for a shorter period than obtains in typhoid fever, frequently not more than a week, and then descends. Its descent may be abrupt to the normal line in one or two days as in Case 19, but is generally more gradual, and frequently by a long period of lysis, with marked daily remissions.

While this is a description of the general plan, there are innumerable variations. The plateau may be broken by morning remissions to the normal line or below it; or may be entirely replaced by a remittent or intermittent peak-like period. Or the descent may be fairly abrupt from the plateau period to nigh the normal line, the temperature then hovering above the normal for a time, to rise again in irregular fashion. Finally at rest it runs a subnormal course 97°-98° morning and evening for weeks, with slight variations.

It shows a marked tendency to recrudescence for periods of several days, or to relapse—16 per cent. of these cases. This occurred at any interval up to ten days after the temperature became normal. Some of these cases of recrudescence were associated with secondary infections of streptococci, as demonstrated by blood culture by Captain Archibald. Two were associated with acute abdominal pain and vomiting. The recrudescences would appear to be gen-

erally the natural expression of the activity of the disease, the variability and changefulness of which is very marked. With most of them there were no appreciable symptoms. The relapse was quite similar to the primal attack; occasionally more severe. There occurred some cases of long continued high temperature of remittent or intermittent type with remarkably little toxæmia or disturbance of function. On the other hand there were also some cases of very moderate temperature course with very severe illness, two of them fatal. The temperature may occasionally become elevated before the patient is aware of symptoms of illness, or may be little elevated or even subnormal with feelings of weakness and illness.

*Skin.* The face is generally more or less flushed, occasionally swollen, in the acute period of illness. The flush remains through the acute stage, and begins to fade as the disease abates, when slight pallor may appear. The flush may be entirely absent from the beginning even in acute cases. Rarely an erythematous flush appeared over the body in the acute period. Sweating is not infrequent at onset, accompanied by hot or cold sensations.

The rose spots appear generally in the second week. They have appeared as early as the fourth day, and as late as the twenty-third day. They may appear at first as indefinite faint rose spots, and gradually become defined in form as round elevated spots with convex surface, sensitive, fading on pressure. They were present in 60 per cent. of cases. There may be only one or two; or they may be present on every inch of the body. In 5 per cent. they extended on to the arms and thighs. As the matured spots fade new ones develop. After disappearing brown stains may remain. They may vary in form and size. Sometimes they are markedly elevated and irregular in outline, the colour fading and leaving the elevations persisting for a time. They may abort before becoming elevated, and quickly disappear, or the individual spot may continue for over a week. These variations may occur in a single patient with numerous spots.

*Nervous System.* Headache is the most frequent of all symptoms, appearing early in the onset, and persisting frequently into the acute stage of illness. It was present in 86 per cent. of cases. Dizziness may be associated with it in acute onsets, or when the man persists on duty. It is more prone to occur after a change of posture.

Delirium may occur in the acute stage of severe cases, muttering, with hallucinations or delusions. One patient, with an



acute period of about a week, with temperature ranging above 104°, became wildly maniacal. He fled from his tent, haunted by terrors of pursuit and death. In thirty-six hours his delirium had entirely passed. His temperature stepped down almost to normal in a stride of twelve hours, and convalescence went on uninterruptedly.

Tender toes, pains in the feet, aching calves occur as in typhoid. In severe cases the abdominal reflexes may be temporarily absent; very rarely they may be increased; the knee jerks also are not infrequently absent for a short time in severe cases.

Chilliness was complained of in 70 per cent. of cases.

*Renal system.* Albuminuria is not infrequent in the acute period; it soon passes. Nephritis occurred in one case, of a serious type. Hæmaturia occurred in another without a continuing nephritis. Retention of urine occurred in one case during the most acute days.

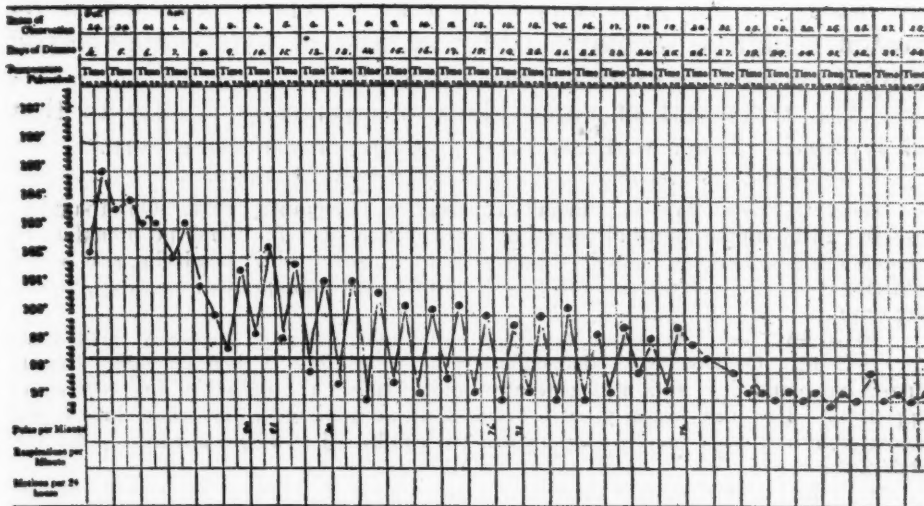
*Special senses.* Impairment of hearing occurred in six cases, due to plugging of the ears with wax. In eight others there was slight temporary impairment without local signs. Otorrhœa occurred in one case.

*Diagnosis.* From an analysis of these cases it is quite impossible to diagnose paratyphoid A. from paratyphoid B. There is no symptom or aspect of disease which one might set forth as peculiar to one, which is not well represented in the other. The average course of temperature in each was twenty-one days.

From typhoid fever there is no single symptom that can be relied on for diagnosis. The relatively more abrupt onset of paratyphoid is of importance. The greater toxicity of typhoid is also of importance. The temperature course should be closely observed. There is more marked tendency to remission, or intermission in any stage of paratyphoid. As the disease advances the more tenacious character of typhoid, the less varying persistence of its temperature course, its greater toxicity, the later development of abdominal symptoms, may aid in diagnosis. It is impossible, however, in a considerable percentage of cases to differentiate clinically the two diseases. Typhoid itself may have an abrupt onset, and paratyphoid may have a gradual onset. The temperature course is not distinguishable in a number of cases, and a moderate typhoid previously inoculated or uninoculated, may be no more toxic than many paratyphoids.

Some cases of pneumonia resemble paratyphoid in the first few days. A case of lobar pneumonia was admitted to the paratyphoid

CHART III.—PARATYPHOID X



Illustrating Case 1. Typical, except that the bacillus isolated from the blood, although resembling Paratyphoid B, was not agglutinated by sera of either A or B.

section with record of abrupt onset, chillness, headache, pain in back, general soreness, with no cough or expectoration; with very little change in the lung; with temperature 104° and pulse 112-120; with severe abdominal pain and marked distension dominating the clinical scene.

The occurrence of bronchitis and localized patches of pneumonia as early complications in paratyphoid emphasizes the importance of careful examination of the lungs. The pulse-temperature ratio is of value in diagnosis.

Some influenzal types and other infections with paratyphoid—like onset, with five or six days temperature were difficult to distinguish at first. It is most important that blood culture should be done in all suspicious cases as early as possible. The association of liquid stools; the pulse ratio; epistaxis; early cough; appearance of rose spots; enlargement of the spleen, are important considerations in diagnosis. The presence of either rose spots or a palpable spleen in conjunction with other symptoms is significant.

Relapsing fever has a more sudden and rapid development than paratyphoid. Blood films should be examined in suspicious cases.

Malarial fever occurred concurrently in several cases of paratyphoid. In two it was present at onset; dominating the picture in one; concealing its expression in the other. In both

the illness was exceedingly severe until the malaria was controlled by intramuscular injections of quinine. The occurrence of repeated chilliness, accompanied by increase of temperature should lead at once to the examination of blood films.

The treatment of paratyphoid is essentially similar to that of typhoid. Space will not permit of its consideration here.

CASE 1. Private W—. Inoculated twice in November, 1914. Onset sudden, October 26th, supper as usual preceding night and slept well. Took no breakfast or dinner; felt a little dizzy. About 3 p.m. seized with severe chill, headache, and severe abdominal pain; vomited some milk; restless during the night; in bed next day, vomiting again.

30-10-15. Very ill, severe headache and abdominal pain, mentally incoherent.

1-11-15. Delirious with delusions, trying to get out of bed at night; tongue furred, grey and dry; abdomen generally tender; spleen not palpable; two rose spots appearing. Had one liquid stool October 28th; no more until 31st, then three liquid stools; vomited; some cough; temperature 103°, pulse 93 at 2.30 p.m.; knee jerks and abdominal reflexes not elicited; pulse not dicrotic.

3-11-15. Delusions still present at times; tongue dry, red, a lateral strip of fur; sordes heavy; abdomen much distended, and tender all over; spleen not palpable.

7-11-15. Headache less severe, rational; abdomen distended; tender in epigastrium; large crop of rose spots extending on to arms and thighs. Bacillus isolated from the blood with cultural characteristics of *B. paratyphosus B.*, but not agglutinable by sera of A or B.

12-11-15. Abdomen flat; no pain or tenderness; heart sounds clear; pulse 56, temperature 98.3-5° at 10 a.m.

15-11-15. New rose spots still appearing; stools liquid; quite bright; tongue clean.

25-11-15. Stools formed; convalescing well.

CASE 2. Private F—. Inoculated against typhoid twice in 1915; illustrates a mild type of case.

10-12-15. Headache, lasting a week; pain in abdomen and chest lasting four days.

12-12-15. Hot, sweating.

16-12-15. Rose spots present, spleen not palpable.

22-12-15. Spleen not palpable, enlarged to percussion looks well, feels well; not much affected by illness.

*B. Paratyphoid A.* was isolated from blood. Temperature on second and third day was 102°, on fifth day 101.2-5°, after this varied between 100° and 97°. Duration twenty-one days.

CASE 3. A. B. R—. Inoculated twice in April, 1915. Onset sudden, October 24th, at night; headache, felt hot; vomited twice; reported ill a.m. 26th; admitted 27th; under observation as paratyphoid suspect five days. On admission temperature subnormal, headache persistent; tongue moist, slightly furred; no rose spots; no abdominal pain, tenderness, or diarrhoea; spleen not palpable.

October 31st. Transferred to medical section. He dressed himself daily for some weeks, not remaining up long because of weakness. No other complaint. About December 1st, complained of sore throat, no other pain. Temperature rose and *B. paratyphosus A.* was isolated from blood.

December 9th. Pharynx very red and swollen, tonsils not swollen; painful to swallow; some cough; first heart sound muffled; second sound low; abdomen flat, not tender; spleen palpable; no spots, no headache or pain except in throat.

December 14th. Vomiting.



December 18th. Vomiting daily since 14th, taking very little nourishment; sleepless; pulse very weak; died at 3 a.m.

**CASE 4. Sapper G—**. Aged twenty-one; inoculated twice, April, 1915. Onset November 2nd, a.m., with "sickness, dizziness, blindness," nausea; pain behind eyes; severe headache; pain in abdomen; diarrhoea. Reported ill on 4th, and remained on light duty till 9th; then relieved and admitted to hospital on 12th; temperature, November 9th, and 10th, 100°-100.2°. On admission occasional headache; tongue furred; spleen not palpable; some rose spots; stools liquid. About November 24th, or 25th, headache began, and chilliness; sweating; pain in abdomen, and in lower part of back and hips; stools continuing liquid.

December 1st. Face slightly flushed; eyes slightly injected; breath faecal; tongue dry, coated dirty white, fissured; mouth and throat dry; thirsty; breath strongly faecal; abdomen soft, slightly tumid; slight tenderness in epigastrium; spleen palpable; rose spots on chest and abdomen; pulse dicrotic.

December 6th. Headache gone; slight soreness in back and thighs; spleen not palpable; abdomen not tender.

December 16th. Tongue still furred, moist; feeling well; no discomfort.

*B. Paratyphosus A.* isolated from blood taken November 29th. In this case there was a distinct remission of temperature to normal for several days, with a recrudescence setting in on November 24th, and running over six days with temperature varying between 100° and 103.2-5° for five days and then dropping by lysis to normal. The relapse was more severe than the original illness.

**CASE 5. Private H—**. Aged thirty-one; inoculated twice, August, 1915. Illustrates gradual ascent and decline of temperature, while lying in hospital. *B. paratyphosus A.* isolated from blood January 1st. First symptoms complained of January 2nd, headache, shivering pain in back; epistaxis on 4th. Spleen became palpable; no rose spots. Temperature rose from 100° on first day by steplike daily ascent to 104° on seventh day, and fell by lysis. Duration of illness nineteen days.

**CASE 6. Private T—**. Aged nineteen, inoculated twice, December, 1914. Onset on December 13th, with diarrhoea and headache; about midnight severe abdominal pain. Eight liquid stools during the night.

December 14th. A little better.

December 15th. Very weak, shivering, pain in back and in limbs and abdomen; dizzy; throat dry; reported ill and sent to hospital.

December 18th. On admission face flushed; eyes heavy; tongue dry, coated grey; breath faecal; giddiness; pain in groins; pain in limbs, very weak; no spots; spleen not palpable; abdomen not distended, but tender; nausea; diarrhoea persists.

December 22nd. Face flushed; expression heavy; breath faecal; tongue furred white, moist; no headache; back and limbs ache; diarrhoea persists. Five stools daily; abdomen soft, not distended or tender; condition improving.

December 26th. Condition worse; looks ill; restless; feels very weak; diarrhoea troublesome; tongue dry, furred; no rose spots; spleen not palpable.

December 30th. Apathetic; sleeps much; tongue dry, coated brown; occasional râles in both lungs; no cough; no rose spots; spleen not palpable.

January 5th. Right cheek flushed; tongue furred, moist; hungry; râles in both lungs; no cough or expectoration.

January 10th. Tongue clean, moist; stools firm; very hungry.

*B. paratyphosus A.* was isolated from blood. Temperature 103° on fifth to eighth day, fell gradually to 100° on eleventh day, rose gradually to 104° on fifteenth day. Then sank gradually to normal, with rises on twenty-second and twenty-eighth day.

**CASE 7. Private K—**. Inoculated twice, October, 1914. Onset: October 26th, off food; chilly; throat hot, parched; causing difficulty in swallowing; abdominal pain. On 27th, diarrhoea began, eight and nine liquid stools; abdominal pain very severe; headache and pain in limbs; nausea.

3-11-15. Face slightly flushed; mouth and tongue dry, furred white in centre, red at tip; vomited twice; pulse 98 not dicrotic; temperature  $100.8^{\circ}$  at 9 p.m.; abdomen distended, tender; gurgling marked; no rose spots; spleen not palpable.

5-11-15. Delirium with hallucinations and delusions, drowsy; tongue heavily coated brown, dry in centre; abdomen distended; painful; rose spots appearing.

9-11-15. Delirium each night.

14-11-15. Resting well; tongue moist, cleaning in patches; no headache or pain.

22-11-15. Face flushed; circumoval pallor; hungry, stools firm.

6-12-15. Aching pains in toes and soles of feet; sensitive to touch; delusions and slight mental cloudiness.

21-12-15. Recrudescence of temperature for several days, temperature  $99^{\circ}$ - $102^{\circ}$ . Evacuated to base.

B. paratyphosus B. isolated from blood.

CASE 10. Private C—. Aged twenty-nine, inoculated twice on August 14th. Prodromal symptoms for two or three weeks; feeling seedy; off food; occasional headache and slight pain in hips.

Onset 12-12-15. Headache, shivering, pain in back, weakness; next day symptoms worse; limbs aching. Reported on 14th, and admitted to hospital.

B. paratyphosus A. isolated from blood. Temperature  $103^{\circ}$  on third day, dropped by lysis to normal on the tenth day.

CASE 11. Private McG—. Inoculated twice, March, 1915. Onset about November 6th, with diarrhoea.

November 8th. Severe abdominal pain, anorexia, headache, pain in back and limbs, chilliness, sweating, weakness, dizziness. In bed for two weeks before admission to hospital.

B. paratyphosus A. isolated from blood. Duration of illness thirty-eight days. Prolonged continued fever.

CASE 12. Dr. H—. Inoculated twice, November, 1915. Onset while convalescing from dysentery, temperature being normal, and stools formed, one daily. Onset sudden December 3rd, temperature at 6 p.m.,  $98.6^{\circ}$ ; a few hours after face flushed, headache severe; shivering; hot later.

December 4th. Temperature  $103.4^{\circ}$  at 6:30 a.m.; limbs aching (for this day only); headache ceased permanently; backache (this day only); no abdominal pain or diarrhoea.

December 14th. Face flushed bright red; eyes injected; tongue coated; mouth breathing; mouth and throat dry; abdomen tumid; spleen enlarged, tender; several rose spots on chest; marked tenderness of skin over kidney areas, tends to sleep in day time; nervous.

December 21st. Face not flushed, tongue a little dry; white fur; slight cough.

December 29th. Tongue clean, moist; slight cough; feeling well; bright.

B. paratyphoid A. isolated by blood culture. Chart shows high intermittent temperature of septic type. With fall to normal on December 24th, and slight rise (to  $101^{\circ}$ ) on December 31st.

CASE 13. Lieutenant P—. Inoculated twice, 1915. Onset sudden, November 25th, p.m.; present at our mess for breakfast and lunch, enjoying food, bright and talkative as usual. At dinner 7.30 p.m., face flushed; expression heavy; quiet; left food unfinished; retired with temperature  $103^{\circ}$ , headache, slight chilliness. Said he had not been quite himself for a day or two.

November 28th. Headache persistent; chilliness troublesome, epistaxis free; constipation; slight cough.

November 30th. Face flushed; drowsy; dull; articulation slow; breath heavy, sour; tongue heavily furred white, moist.

December 1st. Face less flushed; tongue moist, less furred; general improvement; throat dry, stiff; headache relieved for first time; slight cough; had feeling of fullness in

epigastrium, rifting gas; no pain; no nausea; has had occasional aching in thighs; feels very weak; no rose spots; spleen not palpable.

*Bacillus paratyphosus* A. isolated from blood. Chart showed temperature falling by lysis and becoming normal on December 7th.

CASE 14. Sergeant N——. Inoculated twice, March, 1915. Admitted November 30th, to hospital.

Illustrates a relapse after prolonged onset and mild primary attack. It might be regarded as the primary attack, preceded by the symptoms of a three weeks' onset.

*Bacillus paratyphosus* A. isolated from blood.

CASE 15. Sergeant B——. Inoculated twice, December, 1914. Illustrates sudden onset of paratyphosus A. while lying in bed, with very mild symptoms. Admitted for thrombosis of left popliteal vein. At night December 18th, a little hot and restless, later slight chilliness; sponged by sister at midnight and slept quietly. Slight headache next a.m. for two hours, passing off to return no more.

December 17th. Slight cough.

December 20th. Temperature 104°.

December 23rd. Epistaxis.

December 26th. Stools liquid, four daily.

December 27th. Face not flushed; tongue furred dirty white; no mental disturbance; throat dry; rose spots fading; spleen palpable; abdomen tumid; slight tenderness in hypogastrium; cough; moist and dry râles in left lung; no pain.

January 10th. Tongue moist, clean, beefy red; no cough; spleen not palpable; insomnia; hungry.

*Bacillus paratyphosus* A. isolated from blood.

CASE 18. Private B——. Inoculated twice on June, 1915. Onset sudden in night of October 23rd, with headache and abdominal pain.

24-10-15. Unable for work, feeling weak; rested; vomited his tea.

25-10-15. Very weak; slight pain in limbs; admitted to hospital.

26-10-15. Diarrhoea severe, twelve liquid stools p.m.; dizzy; *B. paratyphosus* B. isolated from blood.

27-10-15. Very dull mentally; face flushed, tongue furred grey, moist; abdomen tumid, very tender in upper zone; diarrhoea severe—soup-like stools, benefited by lead and opium.

28-10-15. Pulse 92 dicrotic; temperature 103.4°; rose spots forming, not elevated; headache severe; much abdominal pain; does not rest at night; abdominal reflexes increased; knee jerks absent; tenderness of lower limbs and skin of abdomen; some cough.

30-10-15. Retention of urine; catheterized; vomited once; abdomen distended and tender all over.

6-11-15. Abdomen tumid, tender; pain in epigastrium; cough persists.

15-11-15. Cough troublesome; abdomen painful and tender, relieved by heat; rose spots still appearing; spleen never palpable.

17-11-15. Mouth dry, tongue coated grey brown; cough moderating; pulse 55, small, compressible; temperature normal 9 a.m.; stools still fluid; no headache; abdomen very tender throughout; spots palpable, fading.

25-11-15. Spots faded, leaving brown stains; no abdominal tenderness; stools becoming firm; feeling well; tongue almost clean, moist, face pale.

9-12-15. Recrudescence during last five days; temperature 99°-100° headache, sweating, constipated.

23-12-15. Allowed up for first time, convalescing well.

CASE 21. Private C——. Never inoculated. Onset December 8th, p.m., sudden with severe headache; pain in back and across front of chest; marked chills with sweats; weakness of legs.

December 15th. Face flushed; eyes injected; breath faecal; tongue dry, two lateral strips of fur; mouth breathing; not somnolent; numerous rose spots on front and back extending on to arms and legs; spleen not palpable; dry râles in chest; diarrhoea for one day only.

December 21st. Face flushed; expression heavy; drowsy; respirations 24; tongue dry, glazed; hearing defective; spleen enlarged; dry râles in lungs.

December 29th. Tongue moist; no cough; deafness persists; no pain or discomfort.

January 10th. Flush gone; face pale; tongue clean, moist, feels well.

B. paratyphosus A. isolated from blood. The temperature ranged in this case very high touching 106° on December 9th and 105° on December 11th.

CASE 22. Private R——. Inoculated twice in 1915. Onset sudden, November 4th, about 6 p.m. No supper; severe headache; aching in limbs and back; chilliness; cough and sore throat; slept poorly.

November 5th. Symptoms worse; dizzy; reported ill.

November 11th. Face flushed; expression dull, tongue dry, fissured, furred along borders; sordes; headache; abdomen tumid, not painful; spleen palpable; rose spots appearing.

November 13th. Face flushed, swollen; eyes expressionless; headache and aching pains in back, chest and limbs all diminishing; knee jerks and abdominal reflexes not elicited; abdomen slightly tender; stools fluid; pulse 104° temperature 103·7° at 6 p.m.

November 15th. Haemorrhage free—red fluid and clots. Temperature fell from 102° to 98·3-5°; pulse 104.

November 16th. Abdomen not distended, not tender; spleen palpable; tongue dry, scaling, fissured; no headache; back and limbs ache; pulse dicrotic;

November 25th. Much reduced, pale, thin, weak.

December 2nd. Greatly improved; convalescing well.

B. paratyphosus B. isolated from blood in stool.

CASE 23. Private N——. Inoculated twice, 1915. Onset 27-10-15. Sudden on rising; dizziness, headache; diarrhoea. Next day symptoms more severe, reported ill.

3-11-15. Face flushed; no vomiting or abdominal pain to date; tongue heavily furred grey, dry; sordes; abdomen tumid; spleen palpable, tender; no spots.

7-11-15. Tongue dry, coated; numerous rose spots; cloud of albumen in urine.

12-11-15. Tongue caked, fissured; mouth very dry; stools liquid; pulse 60, temperature 99·7° at 11 a.m.

16-11-15. Tongue moist; fur diminished; new crop of rose spots appearing.

23-11-15. Tissues much wasted; tongue furred, moist; one stool daily, semi-fluid; enjoys food.

12-12-15. Feeling very weak; serum agglutinates *Bacillus paratyphosus* B. completely in dilutions 1:200; no agglutination of *paratyphosus* A.

Blood culture was sterile.

22-12-15. Has had four recrudescences of temperature without appreciable symptoms; taking nourishment well and gaining in flesh; feeling well.

CASE 24. Private M——. Inoculated twice in June, 1915. Onset sudden on December 14th, headache and pain in limbs.

December 17th. Admitted as appendicitis. Headache, abdominal pain, more marked in lower zone; constipation.

December 19th. Tongue moist, furred; headache; pain in abdomen, tenderness in right iliac area; constipation; pain in limbs; bronchitis; no rose spots; spleen not palpable. Blood culture done; B. *paratyphosus* A. isolated.

December 22nd. Signs of peritonitis; operation revealed two perforated ulcers in lower ileum, and a third almost perforated.

December 24th. Repeated copious haemorrhages per rectum; death.



## SOME CLINICAL ASPECTS OF ACUTE ANTERIOR POLIOMYELITIS\*

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**T**HE recent observations and researches in "acute anterior poliomyelitis" have essentially modified our conception of that disease, and have demonstrated the need of totally reconstructing our ideas on the subject. The name, infantile paralysis, is in itself faulty, for neither is the disease confined to infants, nor do epidemics show that even the very large proportion of the cases are accompanied by paralysis.

Evidence is abundant that the disease affects all ages and classes, and that in so many cases is paralysis absent that one has been tempted in following out the older conception to designate the disease as typical, or atypical according as paralysis is present or not.

The picture of the disease, as painted by Charcot, may now be regarded as obsolete, for very many cases of the "atypical" variety occur with general or local signs only, and devoid entirely of the paralytic condition which the great French neurologist considered as essential to the diagnosis.

*Infection.* The disease is essentially infectious and communicable. Experimentally its communicability has been proven with monkeys, and has been amply demonstrated in the human through clinical observation.

There seems to be little doubt that the germ as described by Flexner is the cause of the disease, although quite recently Rosenow claims to have discovered a different organism which invades the system through the tonsils. The virus apparently affects chiefly the central nervous system, and enters the body through the mucous membranes of the nose, the throat and the intestines, and is present to a less extent in the other viscera. It has not been found in the blood.

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The upper respiratory passages are the main focus of infection and the virus is discharged in the secretions. It has been shown, too, that *healthy* persons who are contaminated can similarly convey the secretions from *their* mucous membranes, and further that the virus when experimentally inoculated into the abdomen, the blood, or the brain, also leaves the body by means of the secretions of the respiratory passages.

As in other infectious diseases, so here an incubation period exists, the average duration being eight days.

In experimental monkeys, on the other hand, the limits are wider—from three to forty-six days.

The mode of infection is undoubtedly by personal contact, and convincing evidence has demonstrated that no intermediate way exists; in other words, flies and domestic animals do not communicate the disease except in the rôle of passive carriers. The theory that stable flies conveyed the virus by contaminating the blood is untenable, for the mere reason that no one has yet discovered the virus in the human blood.

The *period of infectivity*, except in the case of chronic carriers, lasts approximately six weeks, but it is also noteworthy that susceptibility of various individuals is by no means identical.

As has been demonstrated in the case of diphtheria by the Shick test, so here in epidemic poliomyelitis, it is certain that many people have a *natural immunity* to the disease. It is in this way that one can explain how frequently in a large family only one person is affected with the disease, though, as a matter of fact, if careful enquiry were made, it would often be shown that others in the family have suffered from atypical and mild forms of the malady. The fact that, after all, only a small proportion of children are susceptible to the disease, should in some way palliate the fear that exists of the terrible consequences of an epidemic.

Immunity is conferred by one attack, and only rare instances exist to the contrary.

Immune bodies have been found in the blood after twenty years, irrespective of whether the attack was mild or severe.

*Various stages exist*, sometimes designated as (1) Prodromal, (2) Preparalytic, (3) Paralytic, or paretic, and (4) Final stage (in which the disease has ceased to spread).

*The prodromal stage* (so-called), varies in intensity and duration. It may be entirely absent, as in the case of over-night paralyses, or, on the other hand, may last over days or weeks.

Its essential clinical features are indefinite body pains, fatigue, and pressure or aching in the head.

The real onset is ushered in with fever, and in most cases is sudden. A rigor is rare, and the previous health is usually described as good. The Vermont statistics of the previous health of 285 patients in their epidemic are of interest.

Of these, in 170, previous health was excellent.

97, previous health was good.

18, previous health was poor.

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Total . . . . 285

The fever is usually high at the onset, from  $101^{\circ}$  to  $104^{\circ}$ , and is of short duration, running to days rather than weeks, and its cessation occurs by lysis rather than by crisis.

There is a cerebral form, however, with high fever, in which a crisis sometimes occurs.

Of the *general symptoms* the following may be noted—malaise with headache, vomiting, constipation (rather than diarrhoea), pains irregularly distributed over the body, but especially in the nape of the neck. The head and neck are held stiff, the patient refusing to flex his chin upon his chest, and the pain is increased on passive flexion (usually the patient is found lying on his side to protect his neck); the jaw not infrequently drops. Hyperæsthesia is a characteristic symptom, and is of three types—cutaneous or superficial, muscular or deep, and muscular on movement. The hyperæsthesia is diffuse as a rule, and if localized it would indicate that this part is about to be paralyzed.

The legs and the spine are seats of election for these disturbances, as is also the abdomen. Spontaneous pain is doubted by many who believe these pains to be essentially due to muscular movement, or friction pressure.

*Weakness* is another characteristic feature. There is flaccidity of all the muscles and sometimes there are involuntary jerky movements of those muscles which are about to be paralyzed.

*Drowsiness* was noted in many cases of the recent epidemic in New York. Such patients were easily aroused for a moment, became quite mentally alert, or irritable, and then lapsed into their former apathy. Delirium and convulsions were rare.

These symptoms which last from five to ten days, may end the clinical picture, and any previous preëxisting muscle weakness may recover with unusual rapidity. These, then, are the cases to which the term "*abortive*" has been applied, i.e. recovery occurs without injury to the motor apparatus.

The predominant signs may be gastro-intestinal, and the disease may be ushered in by anorexia, nausea, and vomiting, or the influenzal type may occur with coryzal symptoms, accompanied by muscular pains, arthralgias, headaches, and general depression. Or, again, there may be anginal signs, sometimes with an acute tonsillitis, or even a middle ear disease.

It not infrequently happens that after cessation of these general symptoms, recurrence may follow with a subsequent paralysis.

*The Cerebral or Polioencephalitic Form.* The existence of this in its pure form, i.e. with spastic paralysis, is denied by many, and, as a matter of fact, it usually is associated clinically with the meningeal variety. The meninges of the brain and cord are usually both involved, and it is hard to differentiate between the two. In this form the acute symptoms appear early. There is antero-posterior stiffness and increased rigidity of the neck, and painful flexion. Brudzinski's, Kernig's and MacEwen's signs are often present. There is drowsiness, extreme hyperæsthesia, and increase of the tendon reflexes. With these symptoms there may be basal meningeal signs (ocular or facial palsies, or monoparesis), or, again, there may be optic neuritis and hæmorrhages into the retina. Most of these symptoms may be transient, or permanent, and if convalescence occurs a dynamic or static ataxia may remain. In these cases the paralysis may occur on the second day, or after the second week.

In addition to the above, many other symptoms may occur indicative of a cerebral lesion—dizziness, nystagmus, narrowing of the pupils, narrowing of the lid cleft, paræsthesia, diminished sensation, tremor of the tongue, herpes, and slowing of the pulse.

Any, or all, of the above symptoms may happen without paralysis, or, on the other hand, may progress and the virus may cause widespread or focal changes in the nervous system from the cortex to the most distant peripheral nerves. The liability of dissemination of the virus is what causes its variegated picture, and it is for this reason that Wickham has classified his types according to the focus of the nervous system involved.

*Bulbar-Pontine Type.* In this variety the motor neurone is involved, and flaccid paralysis occurs. Here, as in other forms of the disease acute signs of infection present themselves. There are great myasthenia, tremor, and isolated lesions of the nerves, or, again, there may be grouping of symptoms where several cranial nerves are involved together.



Dysphagia, dysarthria, dyspnoea, all occur according to the nerves involved, which affect the palate, tongue, pharynx, diaphragm, or serratus muscle. Some of these cases are diagnosed as croup, others as acute pneumonia. Rapidly ascending paralysis in these cases affords the greatest menace to life, though as a rule if patients escape for ten days, there is no further fear of death.

*The Spinal or Bulbo-spinal type.* Here, again, the lower motor neurone is infected and the paralysis is flaccid. This is the commonest of all varieties. In some cases the onset is afebrile and the paralysis comes quickly (over-night), and there may be complete paralysis of a limb, or paresis, or merely a weakness of the muscles.

The changes occur quickly, and for that reason frequent examinations are necessary both for diagnosis and prognosis.

The distribution of the paralysis is very irregular—it may be diffuse or local. All the muscles of a limb may be involved, or only groups, or, again, a single muscle may be attacked.

It is well to test the attitude of the patient as a whole, to test for his tonus, and to examine carefully the muscles of the neck, back, and the abdominal wall. Sensory disturbances of this type are due to lesions of the ganglia of the posterior roots, as has been demonstrated experimentally in monkeys.

*The Abortive Type.* This is by far the most important and dangerous form of the disease, for it is from these cases that infections are so frequently carried, and epidemics maintained. Thirty-five per cent. to 56 per cent. of all cases are abortive in type, and occur with general symptoms devoid of paralysis, or with transient paralysis, or paresis; or, again, the disease may run a course of several weeks, resembling a tuberculous meningitis.

There is no doubt that in all epidemics, patients, who have been exposed to infection, often acquire the disease, showing merely, however, indefinite signs of some general infection and unexplained temperature. These are the cases which become dangerous, and in whom, until the recent epidemic, there was no suspicion of the disease.

*The Diagnosis.* The following features are of importance in the diagnosis. The essential feature is an acute infection of the central nervous system. A flaccid paralysis is not essential to the disease—it may be entirely absent, or merely transitory—in other words, there occurs a sudden onset of a febrile disease to which are superadded certain nervous symptoms. Of these the most important are hyperæsthesia and pains. There is usually stiffness of the neck with pain on passive movement, as well as

unwillingness to flex the neck upon the sternum. Drowsiness is common in the early stages of the disease, and may be the most striking feature. Careful examination should be made for evidence of paresis, or of some weakness of the extremities and the trunk. Brudzinski, MacEwen and Kernig signs should be looked for, and lumbar puncture should be made in all cases as being often of great value in the diagnosis.

*The Lumbar Puncture.* As a rule, the fluid flows out under normal pressure. In the early stages the fluid is clear and abundant, and the fibrin-web is well formed.

Fehling's reaction may be positive. Globulin tests may also be slightly positive. The cell count is usually under 100, and 80 per cent. of the cells are mononuclears, in which the large varieties predominate.

In some cases the fluid is cloudy, with predominance of polynuclear cells. Blood is rarely present, except in cases of trauma. The fluid is to be differentiated from that of cerebral spinal meningitis, where it is cloudy early in the disease, with more albumen, more globulin, and less sugar, and 90 per cent. of the cells are polynuclear. The meningococcus, of course, which is easily found, aids still more definitely in the differentiation. It is more difficult, however, to distinguish between the fluids of tuberculous meningitis, and those of poliomyelitis, more especially as in both instances the fluid may shew no distinctive features.

*The Differential Diagnosis*, especially in epidemics, deals, first, with other diseases of a general or infectious type, in which an acute febrile onset occurs and, secondly, those diseases in which involvement of the nervous system predominate.

One must thus differentiate this disease from tonsillitis, influenza, acute rheumatic fever, pneumonia, toxæmia, gastro-intestinal infections, and various forms of meningitis.

Typhoid-, or pseudo-meningism, must also be considered, while palsies during a local epidemic are always to be regarded as probable instances of acute anterior-poliomyelitis.

In a disease, then, which occurs at all ages, among all classes, and even at all seasons of the year, though especially in summer, one learns from the recent epidemics how important it is to recognize, firstly, that not all people are susceptible; secondly, that the disease may occur in the most atypical forms without developing paralysis—that such cases are the greatest menace to the public health,—and that during epidemics every person with an acute infection is rightly to be regarded as a suspect, if the welfare of the community is to be respected.

## POLIOMYELITIS AS SEEN BY THE SURGEON

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**A**CUTE poliomyelitis has been defined by Osler as "an affection occurring most commonly within the first three years of life, characterized by fever, loss of power in certain muscles, and rapid atrophy". By statistics it has been shown that next to rachitis, poliomyelitis is the most prolific source of deformity, and of deformity which never disappears spontaneously.

Observations made at the Children's Memorial Hospital, Montreal, suggest that it is a disease which, although occurring most frequently within the first three years of life, is not extremely uncommon even up to adult life; that frequently there is a history of an acute febrile onset followed by paralyses and paresis in single muscles or groups of muscles. These paralyses usually attain their maximum intensity at once, or almost at once. Quite as frequently, however, there can be elicited no history of a premonitory febrile attack, but, rather, the history of a slight, perhaps progressive, loss of power in certain muscles, or groups of muscles, which have become noticeable to the friends of a patient who previously was supposed to be in perfect health and condition. In both classes of cases atrophy is soon noticed, and is accompanied quite frequently by deformities of various forms.

*Recent Studies.* The etiology of this affection has been carefully studied especially within recent years. Amongst the most interesting works on this subject is that undertaken in the Rockefeller Institute, notably by Flexner and his associates. Of special suggestion are the studies of Flexner and Noguchi of a minute parasite of globoid character.

Flexner and Clarke have shown experimentally that when the virus of poliomyelitis is introduced into the upper nasal mucosa in monkeys its propagation can be followed from the olfactory lobes of the brain to the medula oblongata and spinal cord. Another

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\*Read in part at a Symposium on Poliomyelitis held at Montreal Medico-Chirurgical Society, October, 1916.

point of interest, which has been demonstrated at the Rockefeller Institute, is the relatively great difficulty of infecting monkeys with the virus of poliomyelitis by introducing it directly into the blood, but it has been demonstrated positively that experimentally the virus of poliomyelitis introduced into the blood may pass indirectly by way of the cerebro-spinal fluid into the interstices of the central nervous organs. To reach the cerebro-spinal fluid the virus must first penetrate the barrier of the choroid plexus which operation requires time.

Paul F. Clarke and H. M. Amos have drawn attention to the lack of agreement as to the manner in which the lesions are produced; namely, whether through direct action of the virus upon the nerve cells or through indirect effect of lesions in the blood vessels and ground substance. They say: the hypothesis that poliomyelitis is a specific affection of the anterior grey matter of the spinal cord has been abandoned. The lesions occur regularly through the structure of the cord including the intervertebral ganglia, frequently in the medulla and brain and quite often in the Gasserian and abdominal sympathetic ganglia.

Flexner has emphasized the naso-pharyngeal mode of infection in poliomyelitis and, according to his view, virus ascends probably by way of the lymphatics from the nasal mucous membrane and multiplies in the pia-arachnoid membranes and the adjacent nervous structure of the brain before becoming established in the medulla and spinal cord.

Clarke and Amos say: the constant involvement of the pia-arachnoid membranes in poliomyelitis, even when no paralysis occurs, and the fact that infection can readily be produced by the intraspinal inoculation suggests anew that in the pathogenesis of poliomyelitis the interstitial tissue changes within the meninges, blood vessels, and ground substance play a determining part.

Clarke, Fraser and Amos have studied the subject of the relation to the blood of the virus of poliomyelitis and stated that it is of more than theoretical interest, as it may have a bearing on the manner of transmission of the disease. On that account they carried out a large series of experiments in order to determine as far as possible this relationship. Experimenting on monkeys, after the first week of acute illness immune bodies which have a neutralizing effect on the virus appear in the blood and it is not improbable that by acting on the virus (human), originally of low infective power for monkeys, they may further diminish the chances of producing paralysis. Continuing their experiments they conclude



that it would appear that only when the blood is overwhelmed by the virus is it certainly infectious over a period of three days or less. Further they state that infection is accomplished less readily through the circulation than by the more direct lymphatic and nervous channels in communication with the central nervous system.

Flexner, Clarke and Fraser (*Journal American Medical Association*, January, 1913) state: Aside from infected persons and monkeys the virus has once been found in external nature: namely, in sweepings obtained from a room in which cases of poliomyelitis had recently been kept (Neustaedter and Thro). This latter finding indicates that the virus is capable of leaving the infected body in a manner that permits of its persistence as dust. Since the virus has been shown to occur frequently, if not constantly, in the discharges of the nose and throat, it is clear that it must escape into the surroundings of the infected, where, when dried, it would retain its activity for a considerable period of time. Clinical observation has awarded a definite rôle to healthy human carriers of the poliomyelitis infection, but thus far indubitable experimental demonstration of the occurrence of such passive carriers has not been furnished. The above mentioned investigators quote the history of a child dying of poliomyelitis where washings were collected from the naso-pharynx of both father and mother. This fluid was introduced into a monkey which died exhibiting characteristic pathological signs of poliomyelitis. An emulsion of a glycerinated spinal cord of this monkey was injected into a second monkey which, in its turn, showed typical signs of poliomyelitis. These authors then say that these experiments leave no doubt that the washing from the naso-pharynx of the parents of this child, neither of whom showed any symptoms of illness and were evidently not suffering from the disease, contained the virus of epidemic poliomyelitis. They say the result described brings indubitable evidence of the occurrence of the virus of the disease in the naso-pharynx of healthy persons who have been in close contact with an acute case of poliomyelitis and affords an experimental basis for the belief, based upon clinical observation, of the occurrence of passive human carriers of the infection.

*Morbid Anatomy.* Originally it was felt that this disease was due to an acute inflammation in the anterior cornua of the spinal cord. This inflammation causes, or is accompanied by, a large amount of small round-cell exudation, hæmorrhages, and thrombosis of vessels. It is followed by necrosis, and finally by

cicatrization. Our views have been considerably modified of late. To-day all writers accentuate the fact that all parts of the cord and indeed the surrounding tissues are affected.

From a purely surgical point of view the important lesions of a pathological nature to be remembered are the swelling and congestion of the purely nervous elements with marked interstitial changes in the cord generally and a co-incident inflammation in the adjacent coverings of the cord. These changes are followed by degeneration of nerve cells and nerve filaments. This, no doubt, is the cause of the permanent paralyses resulting.

*Clinical Aspects.* With or without slight indisposition or feverishness the patient loses the use of one or more groups of muscles. Convulsions at the onset are rare, not usual, as in the acute infantile hemiplegias. Fever although generally, or perhaps always present, may not be noticed. Pain and tenderness in the affected limbs are frequent in those cases with an acute onset, where, also, the paralysis soon reaches its maximum, usually in a few hours. In some cases the pain may persist for weeks. The severity of the pain is said to depend upon the amount of involvement of the meninges. It has been noted that it is especially acute on motion suggesting indeed the pains of an arthritis.

The paralysis is usually at its height in a few hours although in some cases it may be a week or ten days before it is noticed. The paralysis, of course, is typical of the flaccid variety. At the same time it has been suggested that in the very early stages before the actual onset of the paralysis there may be a hypertonicity due to irritation of the nerve cells. The paralyses are irregular in distribution. The distribution of the paralysis follows no rule. The lower extremities are most frequently affected. In over 80 per cent. of cases one or both lower extremities are involved. The paralyses are followed by deformities, which are due to

1. Permanent paralyses due to death of nerve cells.
2. Temporary paralyses due to pressure on, or interference with, nerve cells.
3. Pseudo paralyses due to stretching of muscles and tendons.
4. Contractions due to unopposed muscular tone.

To understand the incidence of these four etiological factors in the production of the deformities following poliomyelitis let us take a typical case. A patient suffers the initial invasion of the virus causing poliomyelitis which may or may not give rise to fever and other symptoms, but which invasion is characterized by certain definite findings. This patient may next show clinical

loss of function of the flexors of the foot with a resulting foot drop. Now this foot drop at this time may be due to two distinct lesions of the nervous system. It may be due, to a minor degree to death of nerve cells in the anterior horns, or it is probably, to a greater extent, due to lesions outside the cells of the anterior horns, which extra cellular lesions cause a temporary or pseudo paralysis. Thus, the typical deformity under consideration is to a greater extent due to a paralysis which is temporary than to a paralysis which is permanent.

The importance of this point is that we can give at this stage a hopeful yet guarded prognosis for improvement.

Following this patient further we notice that this, the first stage of the deformity and the second stage of the affection, is followed by a period of REGENERATION. In this, nerve cells, which have suffered loss of function but not death, resume their function. Infiltration, peri-vascular and interstitial changes, as well as other toxic conditions, cease to exert the paralyzing influence first seen. This period of regeneration is of long duration. By some authorities it is said to last for a year. By other authorities it is said to last for two years.

*Treatment.* Operative procedures undertaken to compensate for deformities directly due to paralyses should not be undertaken during the period of regeneration. If any operative procedures are undertaken during this period they should be directed, only, to the relief of deformities due to lack of muscular balance. On the other hand protective surgical treatment is most highly important during this period. Here exercises, electricity and massage may be useful, especially at a later date, but most important is the supportive treatment secured by the use first of plaster of Paris and later of light braces which are capable of preventing muscular stretching and contraction due to loss of balance.

If protective treatment be neglected during this period of regeneration there will be a great tendency to degeneration—degeneration not of nerve but of muscle and tendon which is due entirely to stretching and disuse. Unless protective treatment is assured whilst the initial central lesion is improving, contraction from unopposed muscular tone, or lack of balance, leads to organic muscular shortening and thus such deformities as equinus suggested in the typical case already used to illustrate these points.

For those organic deformities due to contractures, during the period of regeneration, fasciotomies, tenotomies and tendon lengthenings are indicated. These are the only operative pro-

cedures which are ordinarily allowable during the first two years after the paralysis.

After this period the deformities due to actual paralysis may remain. It is for these that tendon transplantations and operations on bone are indicated. Many and various operative procedures have been suggested for the relief of these deformities. All of these operations have their distinct places in the surgical treatment of poliomyelitis and any of these when employed in properly selected cases tend at least to benefit, if not to cure, by readjusting the muscular balance of the affected parts.

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ANNOUNCEMENT is made of the appearance of a medical publication entitled *Medicine and Surgery*, edited by Dr. Philip Skrainka, of St. Louis, Missouri, who for the past six years has been the Literary Editor of the *Interstate Medical Journal*.

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AN ophthalmological service has been added to the other departments of Bellevue Hospital, New York. It is situated in the new surgical pavilion but is entirely distinct from the rest of the hospital, having its own operating, examining and dressing rooms, a staff of attending surgeons, special internes and nurses; its capacity for the present will be fifty beds. The service is in charge of Dr. Charles H. May, attending surgeon, who will have as his principal assistants Drs. John M. Wheeler and Julius Wolff.



## THE ADVANTAGES OF EARLY SANATORIUM TREATMENT

BY DAVID TOWNSEND, M. D.

*Superintendent Jordan Memorial Sanatorium, River Glade, N.B.*

**T**UBERCULOSIS depends not only upon infection but on reduced constitutional resistance, due sometimes to acute illness or injury, but more often upon unfortunate habits, unfavourable conditions of life, and improper home conditions.

In the treatment of tuberculosis, it is essential, for the best results, that the cases be obtained in as early a stage as possible. The earlier the case, in most instances, the better the result. In order to get these cases education of the public is important. An individual who has been told that he has the disease should believe the physician. Because he feels well and looks well and healthy, is no excuse for putting off treatment until he does feel ill or thinks that he needs treatment, when it may be too late. The friends and family need the education just as much as the patient, too often one hears, "there is nothing the matter with you, you look strong and healthy, you are only lazy," even after the individual has been told by a physician that there is a focus or infected area in the lung or lungs.

In this connexion I would like to urge that every physician give the patient the benefit of the doubt. If there is any suspicion of the disease, the patient should be placed under proper supervision and treatment at once; no harm is done, for the fundamental principles of the treatment of tuberculosis are of as much value in any disease as in tuberculosis. These cases should take a course in a well regulated sanatorium, if for no other reason than for the teaching of how to live properly in order to remain well and for the education of life. Such cases can be more closely watched and every symptom more carefully observed in a sanatorium, than at home. In this way many a case can be prevented from becoming advanced. To wait until the disease is well seated or evident is an injustice, to

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say the least, to the patient and the community, as well as an added expense.

Treatment for the majority of cases is best carried out in the sanatorium. Here the patient is taught his limitations, what the disease means and how to prevent spreading the infection, thus protecting others. The patients are under the watchful eye of a physician, specially trained in the disease, and nurses, trained for the work, and who should be chosen for their force of character and personality. Every symptom is carefully analyzed and those patients who need encouragement are encouraged, those who need to be cautioned are cautioned, and those who need to be reprimanded are reprimanded. The time to relieve worries and anxieties on the part of the patient is now, not to-morrow or next week, and in this way symptoms may be explained at once, and many a molehill prevented from becoming a mountain. Tuberculous patients require a social visit for the best results, not a medical visit. This requires time on the part of the physician and can only be best obtained in the sanatorium. The vital principle of treatment is constant personal supervision of the daily life and careful study, by the physician, of the innermost life of each patient. He should be their friend, confessor and physician. Such a condition can only exist in a sanatorium. The physician and patient are constantly in close touch with each other, which results in mutual benefit. The physician in charge of a sanatorium, for the best results, should be a man who has studied human nature, one who knows individuals and knows from personal observation, what a patient will or will not do. In this way only is he able to start the patient on the right road and this right start from the beginning is essential. It is most important to keep up the courage of the patient. In most instances one with tuberculosis has to begin life anew. He comes face to face with the realities of life for the first time. We know that the mind is a great factor in overcoming the disease. In the sanatorium, with all the powerful machinery at its command, these factors can be carefully directed and regulated, with the result of awakening latent forces of character and sending out into the world the individual with an increased self reliance and power to do good. A new lease of life is given him and with the renewed faith in life and all its realities he becomes a better citizen and a power for good in the community in which he lives. He becomes a missionary, as well, spreading the gospel of true and righteous living and helping many a poor downcast who may have lost faith in himself and the world, as a result of the disease; and en-

courages him to take advantage of the opportunities offered by the sanatorium before it is too late. New habits for good are formed and cleaner lives result. In this connexion, as a part of sanatorium treatment, attention to the needs of the various religious denominations are essential. Pastors of the various faiths should be invited to visit the sanatorium, at more or less stated intervals and minister to the spiritual wants of their people. The benefit from such attention is far greater than we realize.

The sanatorium is a school, where the patient is taught not only how to conduct himself for the present, in order to get well, but also in the future, in order to remain well. For the majority of patients it is impossible to carry on treatment properly at home or to provide the conditions necessary for successful results. Many factors enter into this treatment and it can only be intelligently carried out under sanatorium conditions, where each department is under trained service. Persons over each department should be carefully selected for those qualities which command respect and inspire confidence, not only on the part of the patient, but of the community as well.

By treating numbers together there is a reduction in the cost of what it would be were each treated separately at home. In the restoration of the individual to health and strength, as well as to wage-earning power, there is a saving in the monetary loss to the community.

The aim of the treatment, as is well known, is to produce the formation of antibodies and reduce the autoinoculation, thereby assisting nature; this can only be satisfactorily done in a sanatorium, as in such a place is it only possible to direct intelligently the factors which go to make up this end. For the best results, treatment should be undertaken early, while the disease is in the early stages. In a sanatorium the personal element enters largely into the result desired. One patient sees another getting well, it is an incentive for him to do likewise. This applies particularly to the early cases, as these individuals are more susceptible to impressions than those who are more seriously ill and have lost all interest in life and its surroundings. In the early stages, patients can be more satisfactorily taught to form useful habits and the damaged parts are the more readily healed.

Under the stimulating effect of the sanatorium, with its ideal surroundings of quietude, pure air, free from contaminating dust and dirt, good food carefully selected and properly cooked, the freedom from all irritating influences and the careful medical and

nursing supervision, there is a rapid diminution in the symptoms. Elevations of temperature, with rest mental as well as physical, and the invigorating atmosphere, soon become normal; the pulse rapidly quiets down and the system the more quickly assimilates the nourishing diet, and nature is thereby assisted to a greater degree than is possible in the home, with all its disturbing influences. Cough and expectoration soon dwindle to insignificance and shortly disappear completely. As a result improvement and eventual recovery takes place earlier than it would be possible under other conditions. There is the stimulus of hope and the encouragement which results from the steady progress and sympathetic attention. As recovery progresses, the graduated and increasing exercise, so essential in order to restore one to the degree of health which will enable him again to take up his former duties, if not completely, at least in part, is scientifically arranged under the watchful eye of the physician, so that the greatest possible benefit is obtained in the shortest possible time. Every nerve is strained and all energy directed to this end, so that there are no serious setbacks and treatment is not prolonged unnecessarily.

To sum up, the advantages of early sanatorium treatment are:

Careful supervision, by specially trained experts, of the life of the individual, resulting in a more speedy recovery.

Reduction of the cost of such treatment.

Reduction of the monetary loss to the community, as a result of the restoration to health.

The formation of new healthy habits and character.

The teaching of the realities of life, tending to make better citizens and improved civilization.

The creation of missionaries, who spread the gospel of true living in the community in which they live, who ferret out the early cases and persuade them to take advantage of the benefits provided by the sanatorium before it is too late.

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## DISLOCATIONS OF THE SPINE

BY C. E. SMYTH, M.D.

*Medicine Hat, Alberta.*

**D**ISLOCATIONS of the spine consist of displacements forward, partial or complete, of a vertebra with the spine above it.

A PURE DISLOCATION can only occur in the cervical region, and even here it is not uncommonly associated with fracture.

In the dorsal and lumbar regions it is always associated with fracture, as in the dorsal region the articular processes are nearly vertical looking forward and backward, while in the lumbar region they are also nearly vertical looking inward and outward; making a dislocation without fracture impossible.

In the cervical region, they are nearly horizontal, hence the comparative ease with which a dislocation may occur without fracture.

A dislocation may occur in any part of the cervical spine. The occiput has been displaced from the atlas, with a fatal result always.

The atlas has been displaced from the axis from accidents or in hanging. Usually the odontoid process has been fractured or the transverse ligament torn, and death occurred from compression and laceration of the cord.

Lateral displacement behind these two bones has been recorded, and the result has not been so serious.

Displacement may also occur between any two of the lower five cervical vertebræ, and has been most frequently observed between the fifth and sixth.

It may be unilateral or bilateral. The latter always the more serious.

In either case there is associated laceration of the intervertebral discs and ligaments, and damage to a greater or less extent from laceration and compression to the cord.

The *cause* of cervical displacement is usually a fall, or blow on top of the head with the head flexed. It may also occur from hyper-extension, as in hanging.

The *symptoms* are as follows:

There is a marked rigidity of the neck. Pain is complained

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of in the neck. It radiates down to the shoulders, and is worse on attempted movement of the head.

The symptoms of cord injury vary according to whether the dislocation is unilateral or bilateral, and in proportion to the amount of laceration and compression.

In unilateral dislocation there may only be tingling and numbness along the course of the cervical nerves, or there may be complete paralysis of both arms and legs.

In bilateral dislocation there is always paralysis, varying in degree and extent with the cord injury.

**TREATMENT:** Reduction by extension and manipulation under general anæsthesia is recommended by all authorities.

Operative reduction is not mentioned unless associated with fracture. In the case recorded below, I failed to reduce the dislocation by manipulation and extension, but succeeded by operation.

I believe that by manipulation, one is apt to increase the damage to the cord, and think that where facilities are at hand, operative reduction is the method of choice. It is certain, and one does less injury to the cord.

I wish to report the following case of unilateral dislocation between the third and fourth cervical vertebræ.

A man aged forty years was admitted to hospital May 13th, 1915, suffering from shock and complete paralysis of both arms and legs. There was marked rigidity of his neck. He was conscious, and complained of severe pain down the back of his neck and shoulders. This was worse on attempted movement of his head. He had retention of urine. A crated buggy had fallen on his head. The x-ray showed a dislocation between the third and fourth cervical vertebræ. Reduction was attempted by manipulation and extension under a general anæsthetic. It failed, and the pain was made worse.

He was operated upon May 18th. A vertical incision was made down the back of his neck. The spinous processes and laminae of the upper cervical spine were bared, and with a periosteal elevator the dislocation, which in this case was unilateral and on the right side, was easily reduced. Loops of bronze wire were fastened around the spinous processes of the third and fourth vertebræ, and the wound closed.

His symptoms immediately following operation were worse. His diaphragm, previously active, was now paralyzed. There was retention of urine, and obstinate constipation. The paralysis of the arms and legs persisted, and his respirations were laboured and frequent.

These symptoms, however, gradually improved, and by May 25th he could move his legs, fingers, hands and forearm. He had also recovered movement of his diaphragm.

On May 29th, his wound was dressed and sutures removed. The wound was healed. On June 2nd, he voided naturally. On June 15th, he sat up in bed. On June 17th, he was out in a chair, and walked on the 23rd, without support. On leaving hospital, June 27th, he walked well alone, and could use his arms well, though there was some weakness of both arms and legs. He could use his head and neck freely.

I would like to urge a resort to operative reduction in these cases, oftener and sooner than has been done in the past.

## HAY FEVER

BY F. W. GERSHAW, M.D. C.M.

*Medicine Hat, Alberta*

**H**AY fever is a hypersensitivity of certain mucous membranes to a foreign protein and its manifestations are of an anaphylactic nature. It is supposed that the foreign protein is absorbed into the blood and that its products exert a selective action on certain nerve groups, producing engorgement of the conjunctival, nasal and tracheo-bronchial mucous membranes.

It is believed that the bactericidal power of the nasal mucous membrane is due to a proteolytic enzyme. The pollen reaches the nasal mucous membranes of all persons and in most the proteolytic enzyme splits the protein into harmless products. There must be certain conditions which interfere with the normal digestive function and when these arise sufficient protein may be absorbed to lead to sensitization.

Whatever the cause of the disturbance there occurs an intake of foreign protein which so injures the mucous membrane that it remains in a state of increased permeability for the protein, thus when the protein again comes in contact with the mucosa again it is absorbed unchanged.

The presence of hypertrophic rhinitis, polypi, and of other nasal abnormalities is often noted in those subject to this disease.

It is generally stated that there is a neurotic element responsible for the disease but many of those who suffer most from it are anything but neurotic. Hay fever is most prevalent during August and September. Patients have told me that they expected their attack on a certain date, say August 15th, and when the season would be a little later, as this year, they would be perfectly well until, say, August 22nd.

A drive in the country or some unusual exposure is often given as the exciting cause. A smarting, burning and itching is first noted and this is quickly followed by a redness of the eyes and a swelling

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of the conjunctiva of the mucous membrane of the nose and throat. Next comes a profuse watery discharge from the eyes and nose with sneezing, inability to breathe through the nose and general depression.

All of the twenty-nine cases observed this year had eye and nasal symptoms and in about seven cases the mucous membrane of the trachea and bronchial tubes seemed to be most affected, and marked dyspnoea and asthmatic symptoms resulted. Sleep is often interfered with. By staying indoors some relief is obtained and the symptoms subside during rainy weather. The onset of cold weather and frost brings quick relief.

The treatment is rather unsatisfactory.

Adrenalin chloride, 1 in 5,000, applied locally or injected hypodermically, gives temporary relief in about half the cases. Calcium chloride and sodium bicarbonate are recommended.

In cases with hypertrophic rhinitis the cautery should be tried. One case was cured by removing nasal polypi, and one case was greatly relieved by the use of mixed respiratory vaccine early in the season. We used a stock ragweed vaccine in seven cases and four of them seemed to get some relief, i.e., they did not suffer as much as they did on previous years, but the vaccine was not given early enough.

Dunbar's Pollintine is an attempt at passive immunization but has not been very successful. In using a serum derived from a horse for the first time inquiry should be made as to whether the patient experiences asthmatic symptoms when in the neighbourhood of a horse. Sudden death may follow in these cases as it did in one case in my experience after diphtheria antitoxin.

Change of climate gives complete relief in practically every case. A man will have hay fever in Alberta and improve in a day or two by going to Manitoba or British Columbia. The aster, ragweed and golden rod mature in these places about the same time and it may be a difference in species that causes the improvement; if this is the case the pollen used in making a vaccine should be gathered from the neighbourhood in which it is to be used. By making skin tests the particular pollen responsible can be determined and this should be done also in any case where anaphylaxis is feared. Spraying the nose with oil as a prophylactic measure often gives good results.



## Case Reports

### DIABETES MELLITUS IN A CHILD OF THREE

BY LIONEL M. LINDSAY

*Montreal*

**M.** B. was a Hebrew girl of two years and eleven months when admitted to the Children's Memorial Hospital, Montreal. She was the only child of apparently healthy parents, and had been breast-fed for thirteen months. Although never very robust she had had no acute fevers. She was a nervous child and very fond of sweets, in which she had been indulged.

About two months before admission her parents noticed that her health was failing. She became very irritable, lost her appetite except for sweets and drank large quantities of water. She was very constipated.

There was no history of diabetes or neuropathic taint in the family. There was no consanguinity and no evidence of syphilis.

Her CONDITION ON ADMISSION was that of a pale, poorly nourished child. Her skin was loose, dry and harsh. There were no enlarged lymph nodes. Her tongue was dry and coated, her breath had a sweetish odour. The abdomen was scaphoid. The heart and lungs were apparently normal. She was fretful and irritable. Temperature was 100.2°. Weight 26 pounds.

The URINE was clear and pale, 1034, acid, glucose 7 per cent. acetone and diacetic acid (no albumin, no casts).

Although the outlook did not seem promising, it was decided to try a modified form of the Allen Treatment. Consequently she was given a starvation period which lasted sixty-six hours before the urine became sugar-free. During this time she received nothing but water, weak tea (without milk or sugar), and whisky. The absence of any discomfort, hunger or thirst was remarkable. She cried occasionally for "candy". The acetone was if anything less, although we had not the facilities for making a quantitative test, nor did we take the carbon-dioxide tension of the alveolar air, but at no time did she show symptoms of acidosis.

When sugar-free for twenty-four hours she was started with one gram of carbohydrate, and this was increased by one gram every day. This was given in the form of the so-called 5 per cent. and 10 per cent. vegetables, such as well-boiled spinach, cabbage, beets, turnips, etc. On the third day a soft boiled egg was added.

When she was taking five grams of carbohydrate, sugar appeared in the urine. It is difficult to say whether this was due to the carbohydrate in the diet or not. We rather felt that she had surreptitiously obtained food from one of the other children. This brings out one of the difficulties of treating young children, who cannot coöperate with you.

After another twenty-four hours' starvation period she was sugar-free. She was again started with one gram of carbohydrate, and this was daily increased by one gram until she was taking eleven grams, when glycosuria appeared. During this time she was getting a fairly liberal diet of proteins and fats, chiefly in the form of beef, butter, eggs, and bacon.

Another twenty-four hours' starvation rendered the urine sugar-free. This time starting with two grams the carbohydrates were increased by two grams a day until she was getting eight grams and thereafter by one gram or one-half. This time her tolerance reached fifteen grams before glycosuria appeared.

The fourth starvation period was then instituted, lasting twenty-four hours, and the carbohydrates were being increased as in the third period when the child was taken from the hospital. A diet list was given the parents, estimated to allow a maximum of about fifteen grams of carbohydrates in twenty-four hours.

She had been in the hospital forty-seven days. One could hardly say that her general condition had improved very much. She lost about five pounds while under observation. Curiously enough with the disappearance of the glycosuria and the increase in diet her appetite became more and more voracious. At times she had considerable thirst, but as a rule she had little desire for fluids. She passed from 300 to 500 c.c. urine a day. As her habits were not formed some of the urine was occasionally lost.

The tolerance for proteins and fats was not established, but seemed to be comparatively high. It is a question whether we could have further raised her carbohydrate tolerance by continuing as we had started.

Two months later she was readmitted to the Children's Memorial Hospital. A brief part of the interval had been spent in another hospital. Her condition now seemed too desperate to

warrant any strict dieting, especially as her appetite was enormous, and she whined continually for food, so that she seemed to be munching bread and butter or fruit every time one saw her. She now passed much larger quantities of urine, which contained from 3 per cent. to 4 per cent. of sugar, and gave a marked reaction for diacetic acid.

Her condition went from bad to worse, she became very weak, fretful and irritable, and finally developed a broncho-pneumonia and died a week later. Permission for autopsy was not granted.

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## INFANTILE ECZEMA AND STATUS LYMPHATICUS

BY LIONEL M. LINDSAY

*Montreal*

**J.** P. two months old, was a healthy, full-termed infant. The only child of apparently healthy parents. He had never been acutely ill, but had gradually developed an eczema on his face and head. He had been breast-fed entirely until two days before admission to the Childrens Memorial Hospital, Montreal, when he had been weaned solely on account of the eruption.

His condition on admission was that of a fine, healthy baby, firm of muscle and mentally bright and active. No abnormality was made out except on the face, head, and neck, where he had the conditions usually found in infantile eczema in the acute stage, with hyperæmia, weeping and crust-formation.

As his stools were not very good he was put on a weak initial formula of protein 1·6: fat 0.: sugar 5 per cent. Subsequently this was increased to 1·6: 1·5: 6·5 per cent. His stools were healthy after the first twenty hours, and remained so.

To the eczema was applied a simple form of Lassar's paste (without salicylic acid) on a mask.

Everything seemed to be going well when on the evening of the fourth day after admission he was suddenly seized with a paroxysm of choking and coughing, became dyspnoëic and cyanotic, and passed into a convulsion, from which he never recovered.

He died a few hours later, with a temperature of 105°. At autopsy the only abnormality found was a large Thymus gland

weighing twenty-five grams. The diagnosis was therefore made of Status Thymolymphaticus.

This case is presented because many books on pediatrics (particularly the German) mention the occasional occurrence of sudden death in infants with eczema, and there is a difference of opinion as to the cause of death in these cases.

Pfaundler and Schlossmann report Feer as stating that sudden death in infants with eczema is not infrequent, and that autopsy reveals nothing but status lymphaticus.

Opposed to this is the statement of Hichens who reports six fatal cases out of twenty-eight admitted to his ward in the Northampton General Hospital. These all died with symptoms of shock and collapse, and had fever of from  $103^{\circ}$  to  $104^{\circ}$  at some time. None of these came to autopsy, but he pooh-poohs the idea of status lymphaticus. He also remarks that Gaucher (St. Louis) warned his students against treating cases of eczema in children too energetically owing to the possibility of sudden death.—(*British Journal Children Diseases*. x 117. September, 1913.)

Moro, of Heidelberg, says (in Feer's *Kinderheilkunde*) "occasionally children with eczema suddenly die and without any apparent cause. . . At autopsy many of these show no evidences at all of status lymphaticus, and so we ought to speak of them as acute eczema-death (*Akuten Ekzemtod*)."

The question might naturally be asked whether so-called status lymphaticus predisposes in any way to infantile eczema, or whether there is any relation between these two conditions.

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WE learn from the *Toronto Star* that since the commencement of the war, approximately 50,000 men from Toronto have joined the colours, or more than one-fifth of all the males in the city at the time war was declared and that of these over 2,000 have given their lives and 1,615 have been invalided home. Monies to the amount of \$1,300,000 were collected during the two campaigns for the British Red Cross, and at least \$1,500,000 has been subscribed in Toronto for the Canadian Red Cross although the exact figures are not available. A list of the fatalities that occurred in that city during the year 1916 is also given. These were to the number of 198, including—found dead, 50; died suddenly from heart failure, 43; killed by motor cars, 23; suicides, 15; drowned, 15; killed by street cars, 14; accidentally killed, 12; died from gas poisoning, 12; killed by trains, 8.



## Editorial

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### THE SPECIAL BOARD OF INQUIRY

**L**AST summer Sir Sam Hughes, the late Minister of Militia and Defence, appointed Dr. Herbert A. Bruce, of Toronto, Special Inspector General to report upon the medical work of the Canadian Expeditionary Force overseas. Dr. Bruce, it is needless to say, is a distinguished surgeon, but he had no previous experience of Army Medical matters, save that in May, 1915, without any preliminary Army Medical training he had been created Lieutenant-Colonel C.A.M.C., had spent a few days attached to the Duchess of Connaught's Red Cross Hospital at Taplow, and a few weeks attached to a Canadian General Hospital at the base in France. In all, his total stay overseas scarce exceeded two months. Now, without active service between times, he was appointed full Colonel with extensive powers, one of which was to nominate a "Board of Inquiry" to investigate and report upon the administration of the Canadian Army Medical Corps, both in England and overseas from England. That Board consisted of Colonel Bruce as chairman; Colonel F. A. Reid (of Hamilton, Ont.), Director of Recruiting and Organization; Colonel Wallace Scott (of Toronto, nephew of the Minister), Officer Commanding Moore Barracks Hospital, Shorncliffe; Lieut.-Colonel F. W. E. Wilson (of Niagara), A.D.M.S., Canadian Training Division, Shorncliffe; Lieut.-Colonel Walter McKeown (a Toronto surgeon), President of the Standing Medical Board, Shorncliffe Area, and Captain Charles Hunter, C.A.M.C. (of Winnipeg), a member of the same Standing Medical Board as Secretary. This Board was irregular, both in its constitution and procedure. Authorized by the General Officer Commanding Canadians, Shorn-

cliffe Area, it, strictly, had jurisdiction only within that area, nor indeed had any of its members experience overseas from Great Britain, or indeed outside the Shorncliffe Area, save for the few weeks spent by its President at Le Tréport, and in unofficial wanderings elsewhere during the previous summer; it held no stated meetings; it would seem that no witnesses were cited to appear before it as a body, nor again, were any of those who might be implicated by its findings given the opportunity, in accordance with Army Regulations, to appear at its sittings. After some two months' work it produced a printed, confidential report of 23 sections and some 100 quarto pages, signed by the President of the Board alone, although he stated in his introduction that the members of the Board unanimously agreed to the findings.

It is well known that this confidential report was "one of the frankest indictments of a Government service ever received by a responsible minister". Not a branch of the medical administration but received severe criticism: expressions such as "almost criminal" were not wanting: there was throughout the body of the work not a single word of commendation: lack of attention to the needs of Canadian invalid soldiers was freely charged; contrary to medical ethics a distinguished colleague of the President was named as guilty of careless or neglectful surgery, without being given opportunity to present his side of the case; a reorganization of the Canadian Medical Service from top to bottom was declared necessary and the responsibility for the state of affairs presented was placed upon the shoulders of the Director of Medical Services, Surgeon-General Carleton Jones.

We mention these matters freely because whole chapters of this "confidential" report were permitted by the late Minister to appear in the Canadian daily press day after day without any attempt to prevent their appearance. We cannot believe that it was not in his power under war conditions to prohibit publication.

To this work of weeks on the part of the Committee the

D.M.S. was given three days, subsequently extended to four, in which to formulate a reply. That could, on the face of it, be but preliminary and incomplete; to investigate individual cases cited would demand weeks. The ordinary man would think that in common fairness to the Army Medical Service, containing, as it does, not a few of the leaders of Canadian medicine, and to the distinguished officer at its head, once the accusation had been given publicity, the Minister would have given equal publicity to General Carleton Jones' answer to these serious charges. Not even an epitome of the same has, however, been published, nor can we learn that the reply has been printed. We presume that it has been placed before the Cabinet, but cannot hear of anyone who has seen it—and yet it surely exists.

Undoubtedly the storm of indignation caused by this train of events played an important part in the dismissal of the late Minister from his post.

But so careful are the Imperial authorities not to interfere in Canadian matters that it is doubtful if any action would have been taken had not Colonel Bruce seen fit in his wisdom to recommend a complete disorganization of the British Army Medical System in France, and when recommending a similar disorganization in England, had seen fit to make a direct attack upon the British Voluntary Aid Hospitals and the British Army Medical system generally. Such attacks, supported as they were by the late Minister in his speech at the Empire Club in Toronto, could not be passed by in silence.

When Sir George Perley, appreciating the wholly irregular nature of the previous Board, recognized the difficulty of securing an adequate and properly constituted Board of Inquiry from the Canadian Military Service (General Jones being the senior member of the C.A.M.C. and, as such, having no medical peer who could duly sit in judgement upon him), he applied to the Imperial authorities for assistance, and they for once were willing to take part, the questions raised being more than purely Canadian. By them General Sir William

Babtie, V.C., a foremost member of the Royal Army Medical Corps, was nominated President of a Special Board of Inquiry. Sir William Babtie had gained his V.C. in the South African War, had been head of the Medical administration in Egypt and at the Western seat of war, and now is Deputy Director-General under Sir Alfred Keogh at the War Office. No better qualified and more competent officer could have been appointed. Under him were nominated Colonel E. E. Ashton, General Officer Commanding the Canadian Training Division at Shorncliffe; Colonel J. T. Fotheringham (a prominent Toronto physician), A.D.M.S. 2nd Canadian Division in France; Colonel A. E. Ross, a well-known member of the Provincial Parliament in Ontario, A.D.M.S. of the 1st Canadian Division at the Front, and Colonel J. M. Elder, a Professor of Surgery McGill University, and head of the Surgical Section of No. 3 Canadian General Hospital at Boulogne.

The report of this Board, of which an epitome is given in this issue, is a striking reversal of Colonel Bruce's findings. It is in emphatic disagreement from every one of his main recommendations. As indeed might be expected, Colonel Bruce is convicted of lack of intimate knowledge of army organization, and is charged with ignoring the good work done by Surgeon General Jones and his staff under circumstances of novelty and great difficulty. That work, instead, comes in for high appreciation and the General is specially commended for his zeal, industry and tact. Colonel Bruce's concentration scheme receives whole-hearted condemnation. It is shown that this would involve a capital expenditure of a million dollars for hospital accommodation in England alone. The Board adds: "After conversation with many Canadian "soldiers in different hospitals and with officers and others "familiar with the present system, the Board has failed to "discover any general sentiment among Canadian troops in "favour of their exclusive treatment in Canadian rather than "British hospitals."

As the *Times* remarks: "The following passage is remark-



able in a formal official document: 'It appears to the Board that to separate, on their return to England, men who have fought side by side, must tend to undo the bond of brotherhood sealed in the face of the enemy. The Board is aware that these considerations of high policy do not strictly come within its purview, but cannot refrain from adverting to this aspect of the matter, because it would almost appear as if the report under consideration was based upon the conception that the Canadian Forces had a similar relation to the British Armies as that held by the Allied nations.'

"And again: 'The Board is of the opinion that so long as the Canadian Expeditionary Force forms an integral part of the Imperial Army such a view is no more possible in the United Kingdom than it is in France, and so long as the Canadian troops continue to operate under the command of the Commander-in-Chief, British Expeditionary Force, it must continue to be impossible to discriminate in the medical arrangements of Canadian and British troops.'"

As regards the V.A.D. hospitals the Board finds that in them the patient is well fed, comfortable and happy and receives an amount of care that is only possible in institutions organized on the lines of the home, and points out that this has been an enormous asset in the case of soldiers widely separated from their kith and kin. The economy to the Canadian Government of the V.A.D. Hospital system is pointed out, the nursing such that the Imperial authorities have not hesitated to send V.A.D. nurses to France and the Mediterranean, and no ground is found for Colonel Bruce's grave indictment that "a good deal of the surgery is bad." It is pointed out that not a little of the delay of patients in these hospitals has been due to the imperfect working of the Canadian Casualty Clearing Station (originated and controlled, it should be pointed out, by Colonel F. A. Reid, one of the members of Colonel Bruce's Board.)

In agreement with Colonel Bruce the Board finds that large numbers of Canadian soldiers have reached England who

are unfit for service at the Front (this, however, is a fault which can scarce be laid upon the D.M.S., Canadians, in England), and that additional inspection of Canadian hospitals and of Canadian patients in British hospitals is desirable; that additional consultants should be appointed and that there should be a greater return of invalid soldiers to Canada (increased developments, that is, of movements already initiated by Surgeon General Jones.)

"There is a sequel to the Report." Sir George Perley has cancelled Colonel Bruce's appointment as Special Inspector General. General Carleton Jones has been reinstated as D.M.S., Canadian Medical Services in England, and latest reports announce that he is to be appointed Inspector General of the Canadian Medical Service in Canada, England, and France, to supervise and coördinate, that is, the service in all its extent.

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#### AN APPEAL TO THE PROFESSION

**M**EMBERS of the medical profession, civil and military, in Canada occupy a position of great responsibility since it is through them that the physical condition of Canadian soldiers is established; consequently, physicians and surgeons are constantly called upon to express their professional opinion concerning the physical condition of men, not only to decide their fitness for service, but also in connexion with the awarding of pensions.

The responsibilities of the medical profession, in this connexion, are then of great public importance. Unfortunately it is evident that not all medical practitioners have fully realized the gravity of these responsibilities, added to their professional position by the war. There are instances in which medical men have made ill-considered statements in connexion with applications for pensions and a paragraph which appeared in this JOURNAL for November (page 1021) tells its own story. In that paragraph, editorial comment was made upon a physician who had given a certificate

falsely stating that a soldier was suffering from tonsilitis in order that his leave might be prolonged; the assertion was made that similar instances of unjustified certification were known and that the matter had been placed in the hands of the College of Physicians and Surgeons for the Province of Ontario.

There is no doubt that physicians who have granted false certificates to soldiers have not given full consideration to the seriousness of their action. There is little doubt that, as a rule, they either have been led away by a natural desire to assist a soldier in his attempt to obtain leave or pension, or that they have merely been careless and too willing to accept, without thorough investigation or examination, statements made to them.

Medical men must realize the responsibilities added to their positions by the war. They must realize the effect which a false certificate may have in misleading those expending public monies. No matter what the intention in issuing it may have been, the consequence of giving a false certificate concerning a soldier's physical condition is always the same. If the certificate is acted upon, the Government is defrauded.

If a physician issues a false certificate in good faith and without actual intention to assist in a fraud, he renders himself liable to the criticism of his colleagues. If a false certificate is given wilfully, a physician is not only liable to the condemnation of his fellows; but also to prosecution in the criminal court.

Public duty, professional integrity and personal interest, all unite in making it to the utmost desirable that a physician should always exercise the greatest care in signing statements concerning the physical condition of persons who require a certificate as to their physical condition for purposes connected with the naval or military services or with the granting of pensions.

The wish to do everything possible to assist soldiers, or

their dependents, in obtaining their due, doubtless explains the inaccuracies in those cases in which false medical certificates may have been signed; nevertheless, the results of such false certificates are the same as though wilful misrepresentation had been made—public money is misappropriated.

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### THE CARE OF THE SOLDIER'S TEETH

**A**MONG the ills that afflict the Army at the front, toothache, tender teeth, and sore gums occupy a conspicuous place, if not in text-books and articles in the medical journals, certainly in the trenches and in the thoughts of the soldier. As befits those coming from North America, the Dental Service with the Hospital and other medical units of the Canadian Expeditionary Force was from the beginning of the war distinctly in advance of what obtained with the British medical units, so much so that, wherever they were situated, the dentists attached to Canadian units found themselves worked to their utmost, conducting what may be termed an out-patient department for men from neighbouring British units, proving that at the seat of war the dentist is a most valuable and well occupied officer. But he is of service only when the teeth are in advanced disorder; from the nature of his work, unlike the medical officer, he does not come into constant contact with every man in a battalion: he cannot keep a continued supervision over the health and well-being of the unit to which he is attached, so that he can instil no general personal instruction upon the care of the mouth: he does not, like the medical officer, accompany the battalion into the trenches and is not at hand to deal immediately with teeth troubles. Whether, that is, the army dentist belongs to a separate corps or no, men have first to consult the regimental medical officer and by him be directed to obtain special treatment.

One well-known Canadian medical officer, who has won a well deserved V.C., realizing the situation and the frequent



and urgent need for treatment of the teeth in the trenches if an undue proportion of the units were not to be incapacitated through toothache and sent to the rear, taught himself the simple technique of sterilizing cavities and of packing with a temporary filling, and has found this so helpful to his men that he is convinced that every regimental medical officer in the course of his special training should be instructed in what may be termed Dental First Aid.

There is, however, another widespread condition not needing instrumental care which is painfully prevalent at the front and comes to the notice of the regimental medical officer. This is often referred to as pyorrhœa alveolaris, but pyorrhœa alveolaris it is not, although it may be grafted upon it. It is a specific form of ulcero-membranous stomatitis, spreading over the gums and even the cheeks, which become covered by a dirty whitish and brittle false membrane tending to break down into shallow ulcers. The tonsils may be affected and there the ulcers are apt to be deep. As it progresses the teeth become tender and loose and mastication of bully beef and hard tack becomes impossible. There is one characteristic general symptom, namely, intense depression. As a consequence, leaving aside the inadequate nutrition, the affected men become spiritless and useless as combatants. The condition is definitely infectious: certain units may wholly escape, others may be extensively affected—nor are well marked histories wanting of the spread from man to man.

The first full study of the condition during the war was made by Captain F. B. Bowman, C.A.M.C., pathologist to the Moore Barracks Hospital and now officer in charge of the Divisional Pathological Laboratory at Folkestone. While in some cases he found the pyorrhœal condition and detected amoebæ, in others these were absent. The dominant feature in all was the abundance of Vincent's fusiform bacilli with the associated spirochætes. He thus was led to suggest treatment with a mouth-wash of practically equal parts vinum ipecac.

and Fowler's solution with a little glycerine. The effect of this is very striking. Sixteen drops of the solution placed on the tooth brush night and morning, the teeth and gums gently brushed, and the mouth then washed out with clean water, lead to the rapid disappearance of the membrane, healing of the ulcers, and to comfort and painless mastication in the course of a few days. As with emetin in pyorrhoea, this does not always and of necessity bring about a complete cure. There may be relapses, but by repetition of the treatment the condition is kept well under control. Captain Bowman's full paper was published in the *Proceedings of the Royal Society of Medicine* at the beginning of last year.

Recognizing the need for the care of the teeth, all men of the British Expeditionary Force are supplied with a tooth brush and are instructed to use this regularly. We doubt whether herein the authorities have fully grasped the psychology of the soldier, or indeed of the ordinary mortal. We are reminded of an episode of our own early youth when we were duly provided with and instructed to use a tooth brush, but with it were given no tooth powder or paste. As a result, brushing the teeth was more honoured in the breach than in the observance. Then came a lucky bazaar with its lucky bag and a neat box of Japanese tooth powder as the prize. Possessed of that we from that day brushed our teeth regularly. Without a box of like nature, we learn that the ordinary Tommy at the front uses his tooth brush for anything but cleaning the teeth, more particularly for polishing and, as regards the handle, to take the place of a spoon. What we urge is, give the Tommy a decent preparation and he will care for his teeth regularly. This must obviously not be fluid; nor must it be a powder, for that is liable to break loose in his knapsack; nor yet a paste, for most of us have experienced that these attractive collapsible tubes last but a brief month or so. A firm soap in a neat tin is indicated, for this is both compact and safely carried and with proper use will last ten weeks or more. Such a soap has been el-

borated by Major Wells of the Canadian Dental Corps and, we understand, has been distributed for some months to the Canadian Expeditionary Force in Canada. We have tested it practically and have encountered no more efficient and pleasant preparation. This, or some similar mildly antiseptic soap, should be supplied to all the troops in the British Expeditionary Forces. In the words of a far-flung advertisement we can imagine the Tommies "crying for it".

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### PARATYPHOID

**W**HEN, as late as 1898, Gwyn isolated from a febrile case in Johns Hopkins Hospital an organism differing from the typhoid bacillus, if it had been prophesied that paratyphoid, the disease due to his new found germ, would be more prevalent than typhoid in the world's greatest war, it would not have seemed credible; but that is the present state of the matter.

Whereas perhaps three cases of paratyphoid might then have been found to one hundred of typhoid, the figures in France may now be almost reversed, and no greater proof can be given of the efficacy of antityphoid vaccination. Indeed Widal makes the statement that when French soldiers were on occasion exposed to particularly unhygienic surroundings it was paratyphoid and not typhoid which they developed.

Another alteration in our point of view has come about when the mortality statistics of paratyphoid are exposed—a disease which in peace time and in this country is regarded as practically without mortality, and usually without even serious symptoms, shows a mortality of over 1 per cent. in France and 4 per cent. in the Dardanelles; and also furnishes hæmorrhage, perforation and delirium as some of its manifestations. Another point frequently brought out is that a large number of cases are ambulatory and resemble mild influenza rather than the enteric fevers, and may readily pass unrecognized without bacteriological examination.

It has been shown that the greatest number of positive blood cultures is found on the fifth day of the disease and Willcox has pointed out that an early clinical diagnosis is thus of the greatest value in bringing the case before the bacteriologist and he very pertinently remarks that it is of much greater importance to distinguish paratyphoid from influenza or rheumatism than it is to differentiate it from typhoid since in the latter instance the same measures of isolation and treatment will be taken. Certain clinical features which assist in the differentiation from influenza are: the more gradual onset of symptoms and ascent of fever, the absence of coryza, the rarity of rigors, the mild character of the prostration compared with the degree of fever, the occurrence of diarrhoea, and the absence of cardiac disturbances during the febrile stage.

From typhoid, the generally milder character, the rarity of nervous symptoms, the earlier remissions of fever and the greater tendency to early diarrhoea; as well as the larger, more raised and more dusky spots which occur in a considerable proportion of the cases, give a clue but cannot replace laboratory methods in the diagnosis.

Naturally the relative prevalence of paratyphoid has brought into prominence the mixed vaccine for protection against paratyphoid A. and B. as well as typhoid, and while Leishman is quoted as of the opinion that the efficacy of the typhoid protection is lowered by the mixture, Widal strongly supports the combined inoculation.

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LAST year the city of Toronto applied to the provincial government for power to transfer the medical inspection of schools from the Department of Education to the Board of Health. The matter was left undecided in the hope that some agreement might be come to between the two departments. As this, however, could not be arranged, the question was put to the public vote on January 1st, when the citizens expressed their wishes in no uncertain terms, a tremendous



majority voting in favour of the suggested change. The matter will be taken up again at the next session of the provincial legislature.

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AN interesting case was recently argued in the Chancery Division at St. John, New Brunswick, before His Honour Mr. Justice Grimmer, when a suit was brought against the Moncton Hospital Board by Mr. Francis P. Murphy of Moncton. A by-law was passed by the hospital board last year, by which any person by payment of a sum not less than one dollar was entitled to vote at the annual meeting upon any question, including the election of trustees of the hospital. Accordingly a number of persons paid the necessary subscription and subsequently registered their vote at the annual meeting, when three trustees were elected, one of them being Mr. Murphy. An adjourned meeting of the hospital board was held, at which the by-law previously passed was declared to be *ultra vires*. A second vote was then taken with the result that Mr. Hamilton, one of the retiring trustees, was reelected instead of Mr. Murphy. In bringing his suit, Mr. Murphy claimed that the action taken by the hospital board at the adjourned meeting was illegal, and demanded damages. The contention of the defendants that both the by-law and the proceedings at the annual meeting were illegal was upheld by the Judge, who pronounced judgement in favour of the hospital.

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THE profits from the sale of Lord Northcliffe's book, "At the War," are to be given to the Joint War Committee of the British Red Cross and the Order of St. John of Jerusalem. The book contains a chapter on war doctors, in which Lord Northcliffe pays a fine tribute to the medical services, and although many readers of the JOURNAL are doubtless familiar with the words, since they have been published in the *Times*, we may be pardoned for repeating them here. He says: "If

there be degrees of chivalry, the highest award should be accorded to the medical profession, which at once forsook its lucrative practices in London, or Melbourne, or Montreal, in a great rally of self-sacrifice. The figures of the casualties among them bring home to those who have only the big hospital idea of the war doctor, sad facts that should lead to due understanding of this not sufficiently known but veritable body of Knights in the Great Crusade."

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AN appeal has been made by Sir Reginald Wingate, Governor-General of the Soudan, for a fund to found a permanent memorial to the late Lord Kitchener. It has been decided that the memorial should take the form of a school of medicine at Khartoum, which will be affiliated to the Wellcome Tropical Research Laboratories and thus become a part of the Gordon Memorial College, which was established as a result of a personal appeal made by Lord Kitchener at the end of 1898. Subscriptions may be sent to Mr. Baldwin S. Harvey, Honorary Secretary, Gordon Memorial College, 67 Lombard Street, London, E.C., and all monies collected will be spent upon the building and equipment of the medical school which it is proposed to erect.

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LAST July a number of women physicians were sent by the medical authorities to the British hospital base at Malta to take up duty as members of the Royal Army Medical Corps. Although women physicians had been attached to various hospitals as house surgeons and physicians and one notable hospital had been staffed entirely by women, this was the first time that they had been sent to a hospital base outside the British Isles. The departure, however, has proved eminently successful and the work of the woman doctors has been so satisfactory that in November a request was made by the military authorities for fifty qualified medical women to serve with the Royal Army Medical Corps.

## THE CANADIAN ARMY MEDICAL SERVICE

## REPORT OF THE BOARD OF INQUIRY\*

THE report of the Board of Inquiry, appointed in November by Sir George Perley, High Commissioner for Canada, has been issued. It is signed by all the members, and is dated December 21st, 1916. It opens with some general observations as follows:

The Board having assembled in accordance with War Office letter No. 121-medical-2893, A.M.D.I., dated November 25th, 1916, proceeded to consider the report on the Canadian Army Medical Services by Colonel H. A. Bruce, the Special Inspector General appointed by Major-General Sir Sam Hughes, and a reply thereto by Surgeon-General G. Carleton Jones, then Director Medical Services, Canadian Expeditionary Force. Both officers have been examined by the Board, and in addition evidence from the officers and others enumerated in the appendix No. 1, was heard. A report of the evidence taken and copies of various documents submitted to the Board are annexed to this report. The Board, in preparing its report, has not only taken into account the evidence submitted to it, but has ventured to incorporate into some of its recommendations its own knowledge of conditions so far as they affect the efficiency of the Canadian Army Medical Service.

In making this report the Board has constantly kept in view not only the welfare of the sick and wounded of the Canadian Expeditionary Force, but the interests of the Government and people of Canada, and has been especially careful in its comments upon the work of the Director of Medical Services, whose administration has been so severely criticized, by the Inspector-General in his report and in his evidence.

It will be convenient to summarize here the principal points emerging from Colonel Bruce's report. These are:

- (a) The concentration of Canadian sick and wounded in Canadian hospitals.
- (b) The suitability of V.A.D. hospitals for the care and treatment of Canadian soldiers.
- (c) The system of medical boards.

Before offering any general remarks on these topics, the Board thinks it right to explain that up to February, 1916, the accepted policy was to provide special hospital establishments for Canadian

\* Reprinted from the *British Medical Journal*, January 6th, 1917.

patients; that about that date, owing to various considerations, practical and sentimental, it was determined, with the consent of the War Office, to deal with Canadian patients in the same fashion as British patients are dealt with—that is, by distributing them throughout the United Kingdom to the great series of central hospitals, each with its group of affiliated auxiliaries.

In the report of the Special Inspector-General the latter system is condemned, and a return to the policy of Canadian hospitals for Canadian sick and wounded advocated. The issue is a fair one, for there is much to be said on both sides; but the Board, after very careful consideration, has come to the conclusion that the policy therein recommended is not only unwise but impracticable, having regard to the amount of accommodation that would be required owing to the increase of Canadian troops in Europe.

The arguments for and against are set forth under the headings into which this report is divided, but it will be convenient to consider here the principal reasons that have led the Board to the opinion that a reversion to the original scheme of concentrating Canadian sick and wounded in Canadian hospitals is impossible.

All through the report of the Inspector-General the dominating idea is a conception that the Canadian Expeditionary Force is something separate and apart from the Imperial army, a conception that may be summarized as the "water-tight compartment" policy in matters medical. The Board is of opinion that as long as the Canadian Expeditionary Force forms an integral part of the Imperial army, such a view is no more possible in the United Kingdom than it is in France; and, so long as Canadian troops continue to operate under the command of the Commander-in-Chief, British Expeditionary Force, it must continue to be impossible to discriminate in the medical arrangements of Canadian and British troops. The personal experience of the majority of the members of the Board amply confirms this view, so far as the arrangements at the French front and at the Overseas bases are concerned, and the Board has satisfied itself that it would be inadvisable to attempt separation on the return of the sick and wounded to the United Kingdom.

It appears to the Board that to separate, on their return to England, men who have fought side by side, must tend to undo the bond of brotherhood sealed in the face of the enemy. The Board is aware that these considerations of high policy do not strictly come within its purview, but cannot refrain from adverting to this aspect of the matter, because it would almost appear as if the report under consideration was based upon the conception that the Canadian



Forces had a similar relation to the British armies as that held by the allied nations.

The policy that the Board ventures to attribute to Colonel Bruce would have prevented the use of Canadian medical units in the Mediterranean, because Canadian troops did not happen to be employed in that theatre of war, and the sending of Canadian hospitals to Paris for the use of the French sick and wounded. Indeed, the sending of Canadian medical units to the Mediterranean is criticized from this very point of view in the report of the Inspector General. Again, and for similar reasons, the Board is in profound disagreement with the view that Canadian Army Medical Corps personnel should not be associated with the British Service in scientific inquiries and in other work; on the contrary, it is of opinion that such participation is both desirable and necessary in the best interests of the two services. The Board, too, is at variance with the contention that the services of the Canadian Army Medical Corps should in the main be confined to Canadian troops; field ambulances serve primarily the Canadian formations, but in the case of the line of communication units, their work must of necessity be largely with other than Canadian troops. This aspect of the case, it is fair to say, was repudiated by the Inspector-General when placed before him.

The Board feels bound to place on record that in some of the opinions expressed by Colonel Bruce he is misled by a lack of intimate knowledge of army organization and of the inter-relation of the various branches of the service, as in some of his criticisms he has failed to make allowance for the sudden expansion of the army and for the unavoidable want of specialized training in its ancillary services. Such imperfections as have existed are rapidly being remedied, and it is plain truth to say that in no war in history has sickness been so well controlled or the sick and wounded so well cared for. The Board, relying on its own observations and the evidence laid before it, is abundantly satisfied that the Canadian sick and wounded have been thoroughly well cared for, not only in the Central Hospitals, whether British or Canadian, but in the Voluntary Aid Hospitals, which Colonel Bruce criticizes. These latter hospitals are the outcome of a mobilization of the medical resources of the United Kingdom, and in them Canadian soldiers are not only well cared for professionally but are comfortable, happy and at home. The Board desires to emphasize its dissent from the criticisms of these institutions, which it believes to be unjust and undeserved.

The other principal issue raised in the report of the Inspector-General, the system of Medical Boards, is dealt with in detail hereafter, and the Board agrees that there is much justice in the criticisms levelled at the complicated arrangements that have been permitted to grow up. With the reorganization proposed the Board is unable to concur, and has ventured, as the result of the combined experience of its members, to suggest a system that it believes to be simple and likely to be practical in operation.

The Board does not concur in Colonel Bruce's view that a complete reorganization from "top to bottom" of the Canadian Army Medical Service is necessary. In its opinion, the reforms he suggests would not remedy the defects he deplures, which are not due to the system, but to inexperience on the part of officers, military and medical, and to defaults in administration which are commented upon in the detailed criticisms that the Board has felt it its duty to record.

The Board cannot conclude this general review of its findings without adding that the report of the Inspector-General ignores the good work done by Surgeon-General Jones and his staff under circumstances of novelty and great difficulty. The Board has not hesitated to criticize those matters wherein, in its opinion, the Director of Medical Services has failed, but does so with great reluctance, for it is satisfied that much of what has been accomplished has been the result of his zeal and industry, while the good relations of the Imperial and Canadian services are largely due to the tactful performance of the many delicate duties that fell to his lot.

The Board would also point out that the lack of an organized Canadian staff was a very serious handicap to the Director of Medical Services in his dealings with the important subject of non-effective troops.

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The remainder of the report deals with Colonel Bruce's criticisms paragraph by paragraph. It will be seen that certain sections are of general interest, and have a direct bearing on several matters of concern to the profession in the United Kingdom.

*I.—Soldiers arriving in England from Canada Medically Unfit.*

The Board is agreed that large numbers of soldiers have come and continue to come from Canada who are unfit for service at the front. The cases come under two main headings:

1. Men who do not comply with recruiting standards as to age.

Of one series of cases, numbering 1,366, submitted to the Board, 849 were either under or over age. As the recruiting medical officer is not required to consider the age of recruits, the charge as regards the C.A.M.C. is reduced to the second class—namely:

2. Men who are unfit by reason of a physical disability. The Board is satisfied that a large number of men have been passed who ought not to have been passed, owing partly to inexperience on the part of examining medical officers, partly to hurry, partly to carelessness, and partly to the opinion of the medical officer being overridden by commanding officers.

The Board advises that examining medical officers should be responsible, as in the British service, that a recruit's apparent age corresponds with his declared age; that there should be inspectors of recruiting familiar with the requirements of the army in the field; that no soldier should be sent overseas unless classified by a medical board as fit for general service.

The Board has come to the conclusion that this important matter has not received the attention it deserved, and that adequate representations with regard to it have not been made. The Board is not prepared to define the share of the responsibility of the D.M.S. for this failure, because the Adjutant-General's Branch of the staff, to which the subject pertains, was not represented in England until recently, but it considers that, in the absence of the Adjutant-General's Branch, it was the duty of the D.M.S. to represent by all sources open to him the fact that large numbers of men were reaching England unfit for general service.

### *II and III.—Distribution of Casualties and Concentration of Hospitals*

Under this head the Board points out that Colonel Bruce's objections to the present system of treating a moiety of Canadian patients in Imperial hospitals distributed throughout the United Kingdom, and his advocacy of the policy of concentrating them in purely Canadian hospitals, are interdependent.

As regards distribution, the Board recognized that the Canadian soldier returning from England to France is not in the same position as the British soldier so returning, but, despite this important difference, the Board is of opinion that, practically speaking, a system of distribution which is satisfactory in the case of the British soldier, need not be inefficient in the case of the Canadian.

The Board considers that what is required to meet the special circumstances of the Canadian soldier is an extension of the system

of Canadian convalescent hospitals, and organized coöperation as regards inspection between the Canadian and Imperial services. The Board is satisfied that considerable difficulties must arise in the collection and distribution of Canadian invalids to Canadian hospitals, because the problem begins at the front, and, from the personal experience of the majority of the members of the Board, it believes that it is quite impracticable to earmark and collect Canadian casualties at the base in France, and that it would be difficult and inconvenient to direct them solely to Canadian hospitals in England. Special arrangements for their despatch would be necessary, and while the Board had it in evidence from the principal embarkation medical officer that the difficulties are not insuperable, they are sufficient to enhance the complexities of an already complex problem. The administrative difficulties in this respect would, the Board believes, be found in practice serious, and would almost necessarily involve the provision of clearing hospitals at or near the ports in England. Even if the difficulties of collection in France could be got over, it would necessitate the holding of Canadian patients in France until a sufficient accumulation occurred to justify special arrangements for distribution on arrival in England. This policy the exigencies of war would be bound to frustrate. If, however, this proved to be possible, the difficulties of distribution to Canadian hospitals in England would disappear.

But the Board is of opinion that the present system must hold the field if it is found impracticable to find suitable hospital accommodation for the whole of the Canadian sick and wounded in the Shorncliffe area and its neighbourhood, to which it is important that any such scheme should be confined. The establishment of Canadian hospitals in England, even if all were situated south of the Thames, would not meet the requirements, but might even accentuate the difficulty of distribution, and, in either case, the Board is satisfied that the policy of centralization would be unwise and expensive, and is impracticable. It considers that it is unwise on broad grounds of policy, believing that it is to the best interests of both British and Canadian soldiers that they should meet one another, and, as illustrative of Canadian sentiment in this matter, remarks that the Canadian hospitals at Beachborough, Taplow and Orpington are governed by explicit provisos on the part of the donors that they are not to be confined to the treatment of Canadian sick and wounded.

That such a policy would be expensive is certain, for it would probably be necessary to erect hut hospitals, at large cost and with



much delay. The Board is of the opinion that such expenditure would not be justified without very grave and urgent necessity. It does not believe that any such necessity exists, for, after conversation with many Canadian soldiers in different hospitals and with officers and others familiar with the working of the present system, it has failed to discover any general sentiment among Canadian troops in favour of their exclusive treatment in Canadian, rather than in British hospitals. The present system permits the individual Canadian soldier to select, subject to administrative convenience, the neighbourhood to which he would desire to be sent, and, while there is evidence that Canadian soldiers from time to time ask to be sent to a particular locality or transferred from one hospital to another, the reason generally given is to be near relatives in the United Kingdom, and is not generally associated with their treatment and comfort in Imperial hospitals.

The Board does not suggest that the existing Canadian hospitals in England should be given up, and does not object to a reasonable extension of these hospitals, but, even without extension, there is no reason why any wish on the part of a Canadian soldier to be treated in a Canadian hospital should not be met, just as the desire to go to a particular neighbourhood in Great Britain is gratified whenever circumstances permit.

Even if sufficient separate accommodation could be provided for all Canadian casualties in one area in England, it would either be necessary to retain a large number of empty beds to meet the eventualities of war, or, if these were utilized for British patients, as Colonel Bruce suggests, then they might not be available for Canadian patients when the Canadian Corps was heavily engaged. In the opinion of the Board, such a policy must of necessity break down under the stress of war. The special advantages that Colonel Bruce claims for a policy of concentration can be attained with existing arrangements, which are sufficiently extensive to permit of the utilization of the special skill of Canadian physicians and surgeons in all branches of medicine and surgery.

The question of cost cannot be considered apart from that of the existing arrangements, whereby Canadian soldiers are subsisted in Imperial hospitals, whether military or V.A.D., at a cost of three shillings a head a day, whereas the average cost to the public of Canadian soldiers in Canadian hospitals, as of British patients in British hospitals, is from six to seven shillings a head a day. The difference is due to cost of personnel and equipment. The Board thinks it right to state that similarly British patients are main-

tained in Canadian hospitals at the same charge of three shillings, but obviously the balance of advantage is in favour of the Canadian Government, and if Colonel Bruce's policy were adopted the many advantages of this reciprocal agreement would be very much diminished.

Although it has considered these questions on a money basis, the Board believes that, if it could be established that the Canadian soldier suffered from being treated in Imperial hospitals, the Canadian Government would not consider the cost in any way, but there is ample evidence that Canadian soldiers have not suffered from being treated in Imperial hospitals.

This important subject has been dealt with at some length, because the chief consideration in the reorganization suggested by Colonel Bruce is a policy of preferential treatment, which the Board considers impracticable in its application, and which it believes to be unwise and opposed to Canadian sentiment.

#### *IV.—Unnecessary Detention in Hospitals, etc.*

The Board does not agree that there is a lack of efficient medical inspection in hospitals, but agrees with Colonel Bruce and Surgeon-General Jones that additional inspection of Canadian hospitals and of Canadian patients in British hospitals throughout the United Kingdom, is desirable from the Canadian standpoint. There is evidence that the desirability of special inspections of Canadian patients in British hospitals was not fully recognized by the then D.M.S. until July of this year, but the Board is of opinion that this policy, with which the Board is in complete sympathy, should have been initiated at an earlier period. From early in the war the Canadian Red Cross had organized a system of visits to Canadian patients in British hospitals throughout the United Kingdom, and the valuable information collected in this fashion was available to the D.M.S. and frequently utilized by him.

The Board agrees with Colonel Bruce and Surgeon-General Jones as to the desirability of additional consultants being appointed, and thinks that there is ample scope for a consulting surgeon, as well as a consulting physician, in Canadian hospitals in the United Kingdom, although it recognized that Canadian hospitals have had the advantage of the advice of experienced consultants. The Board suggests that it would be better if Canadian consultants were appointed to the Imperial Army, instead of their services being confined to Canadian hospitals, and if this policy were adopted it might apply not only to the United Kingdom but to

France. The Board thinks it right to refer to the allegation that there have been many errors of diagnosis and treatment. The Board is decidedly of the opinion that there is no cause for alarm on this score, as such errors as have come to notice are incidental to the exigencies of active service, and believes that they do not prevail to as great an extent as in the ordinary course of practice in civil hospitals whether in Europe or Canada.

In opposition to the views of both Surgeon-General Jones and Colonel Bruce, the Board is of opinion that it would be preferable that the head of the medical service should remain in Ottawa as the principal medical adviser of the Government upon all questions, such as the medical examination of recruits, the organization of new units, selection of medical officers for commissions, and other questions upon which the Government in Canada might desire the advice of a senior and responsible officer, matters which, in the opinion of this Board, are intimately bound up with the success of the forces in the field.

The Board is agreed that there is a considerable accumulation of convalescent Canadian patients in Imperial hospitals, and that this is due to the insufficiency of accommodation at present in Canadian convalescent hospitals. The Board is also satisfied that there are in the United Kingdom a large number of Canadian invalids who ought to be sent back to Canada, but whom it has been impossible to repatriate because the available accommodation in Canada has been insufficient. The Board attaches the greatest importance to the early provision of sufficient accommodation for returning invalids in Canada, and directs attention to the fact that all invalids returning to Canada have so far been conveyed in returning transports or passenger steamers. In view, however, of the increased number of Canadian troops in Europe and the growing number of serious cases, who it is generally agreed should be sent to Canada at an earlier stage, the Board suggests that the provision of a regular hospital ship should be considered.

#### *V.—Use of V.A.D. Hospitals*

The Board of Inquiry does not concur in Colonel Bruce's recommendation that the use of V.A.D. hospitals by the C.A.M.C. should be discontinued, and makes the following remarks on the system:

1. *Inefficiency:* It does not agree that, as a class, the V.A.D. hospitals are inefficient, and the evidence which, to Colonel Bruce, indicated inefficiency, was really due to defective classification, whereby some V.A.D. hospitals, which were not equipped for all

purposes, occasionally contained patients for whom treatment should have been prescribed in a hospital of a higher scale. Even in such cases, facilities for the transfer of such incidental admissions to primary hospitals were always available, and in no case did the Board find that faulty treatment could fairly be attributed to the V.A.D. system.

2. *Expense*: The charge for a patient in a V.A.D. hospital never exceeds three shillings a day, and the Board has it in evidence and is satisfied that the cost per patient in a military hospital is at least six shillings per day.

3. *Unsatisfactory*: Colonel Bruce's point of view would appear to be that those hospitals which are the inevitable outcome of a general mobilization of the medical resources of Great Britain are unsatisfactory from an administrative and professional point of view, but the Board is satisfied that in no other way could the situation arising out of the war have been met, nor could it be altered now without vast and unjustifiable expenditure. The Board in its report passes in review the following points mentioned by Colonel Bruce as evidence of the unsatisfactory nature of these institutions:

(a) *Inconvenient Location*, the Board considers, was in many instances inevitable, as accommodation had to be made use of wherever available. The inconvenience is largely minimized by the system of classification of patients, by ample facilities for transportation, and by periodic inspections by Imperial and administrative officers.

(b) *Medical Staff*: The medical staff is generally found from the local practitioners, who nearly all give their services gratuitously and make large sacrifices in so doing. The investigations of the Board do not support these allegations of inefficiency. The standard of professional efficiency naturally varies, but there is no ground, even in the special reports made by Colonel Bruce's direction for the grave indictment contained in his report, "a good deal of the surgery is bad;" and if patients have been retained in these hospitals too long, it has been caused by the insufficiency of accommodation in Canadian convalescent hospitals and to delays in connexion with the C.A.M.C. in England.

(c) *Nursing Staff*: In all hospitals there is a nucleus of trained nurses (10 per cent.) whose work is supplemented by the devoted efforts of the Voluntary Aid Detachments, the members of which have undergone courses of instruction in first aid and home nursing, and who, after two years of hospital work, are many of them so efficient that the Imperial Government has not hesitated to send them to the great hospitals in France and in the Mediterranean. In no case has the Board had reason to be other than satisfied with the nursing in these institutions.

The Board states that the comments made in Colonel Bruce's report on the V.A.D. hospitals have been widely resented and expresses the opinion that these strictures are unjustified and regrettable. While it agrees with Colonel Bruce that patients could sometimes be more advantageously treated in, and more speedily evacuated from, large military hospitals, the advantages of the V.A.D. system should not be overlooked in this regard. In these hospitals the Board found the Canadian patient well fed, comfortable and happy, and receiving an amount of care only possible in institutions organized on the lines of "the home". This has been an enormous asset in the case of soldiers widely separated from their kith and kin.

#### VI.—Administration of Shorncliffe Group of V.A.D. Hospitals

The report explains the system under which V.A.D. hospitals are affiliated in groups to central military hospitals and the par-



ticular arrangements made at Shorncliffe. It expresses the opinion that the Canadian staffs employed in connexion therewith have been larger than were necessary. It does not agree that the employment of C.A.M.C. personnel should be confined to purely Canadian institutions or that the Canadian ambulance service should not be used for Imperial patients. In all these points the Board is opposed to the policy suggested by Colonel Bruce and in agreement with that carried out by General Jones.

*VII.—Relations with the Red Cross*

The report of the Board makes reference to the necessity for the continuance of the past harmony between the Red Cross Society, British and Canadian, and the medical service, and considers that the admitted irregularities at one place do not vitiate the policy, but adds that while rumours of irregularities were widespread, they apparently did not reach the ears of the D.M.S. The Board also adds that glaring departures from accepted service methods of administration passed unnoticed at Surgeon-General Jones's inspections.

*VIII.—Detailing of C.A.M.C. Personnel for Imperial Service*

The Board disagrees with Colonel Bruce, and expresses the strong opinion that the forces and resources of the army must be pooled in this struggle, and that interchange of personnel is desirable and necessary in the interests of both services. It is of opinion that the very instances quoted by Colonel Bruce prove the desirability of such interchange and believes that the policy adopted by Surgeon-General Jones will commend itself to the authorities.

*IX.—Situation at Shorncliffe*

With regard to the situation at Shorncliffe, where the A.D.M.S. Canadians was also A.D.M.S. Dover (British), the Board, both from its own observations and experience and from the evidence submitted, is opposed to the opinion expressed in Colonel Bruce's report. The Board is satisfied that the arrangement has been, and is, a good and satisfactory one as regards both the Canadian and British interests.

*X.—Surgical Operations not Tending to Increased Military Efficiency*

The Board agrees with Colonel Bruce that much surgery fitting in civil life is not advisable in military practice, and has evidence to

the effect that efforts have been made to induce newly commissioned medical officers to regard physical unfitness from a military point of view, and that experience has effected a marked improvement in this respect. It appears that in the appendix to his report mention was made of twenty-one cases, and the Board states that one at least of these has come under its attention. The hospital records of that case were, the Board states, incorrectly reported by Colonel Bruce. The man had not suffered from the disability stated, the operation performed was not as stated, and the mention of the surgeon's name accentuated the grave injustice of the criticism.

#### *XI and XII.—Special Hospitals*

The Board is of opinion that a special hospital, such as that at Ramsgate, is essential. If treatment had to be delayed until the patient could be sent to Canada, even if sufficient accommodation existed there, the beneficial results of early treatment would not be attained. The Board, however, recognizes that many cases have been admitted and detained there whose immediate transfer to Canada was desirable, and this remark is applied in a special degree to cases of amputation. The Board, however, had evidence that the facilities existing in Canada are not as yet sufficient to meet the requirements in this respect. The Board, while recognizing that trades should not be taught in England, believes that there is a distinct therapeutic value in work for selected cases. The value of institutions in fitting men to return to duty was shown by the report of the officer commanding, which stated that 60 per cent. of the patients were discharged to full duty. Similar remarks are made with regard to Buxton Hospital, and the report states that Colonel Bruce admitted that his criticism had reference to its use for cases of chronic rheumatism. The Board is in agreement with his views in this respect. The consulting physician reported that seventy-one of all the cases treated at Buxton had returned to full duty. The Board states that it holds that this hospital serves a useful purpose.

#### *XIII.—Venereal Situation*

The Board finds that the efforts of the D.M.S. soon after his arrival in England, to secure adequate provision for these cases were not invariably supported by the higher authority, proper accommodation was not provided as asked, and, as a result, the discipline and control essential in this class of case were not secured. A solution of the difficulty can only be reached, the Board holds,

by coöperation between the medical service and the Adjutant-General's Branch, and concurs in the view that the segregation of all such cases in an area by themselves, under special arrangements for treatment and discipline on the lines of a convalescent hospital, which combines treatment and training, is essential.

#### *XIV.—Infectious Diseases*

The Board states that the system of utilizing the isolation hospitals of local authorities is that generally adopted by the British service whenever possible, and considers that it was properly followed in this instance.

#### *XV.—Medical Board Situation*

The Board of Inquiry agrees that there is a necessity for reformation in the medical board situation and in the classification of casualties. It is of opinion that an easy solution of the problem would be the adoption of the British system so far as applicable, and makes suggestions in this direction.

#### *XVI.—Records*

The Board generally agrees with the criticisms made by Colonel Bruce, but points out that they are of universal application, and apply to all medical services in all wars. The desirability of improvement has not been lost sight of, and all available information is the subject of record by the Medical Research Committee. The Board does not agree that the defects in the system are attributable to the C.A.M.C., or that the proposals of Colonel Bruce are practicable. It is satisfied that Surgeon-General Jones has done a great deal towards the establishment of a better system than has hitherto been available in armies in the field.

#### *XVII.—Pensions*

The Board notes that Colonel Bruce withdrew certain remarks to which his attention was drawn, and expresses the opinion that the ultimate investigation of pensionable cases should take place in Canada.

#### *XVIII.—Coordination*

Many of the matters under this head are dealt with by the Board in its comments on the first section of Colonel Bruce's report. It is of opinion that the only course is the enforcement of stringent examination on enlistment, and adherence to whatever standard of

fitness may be laid down in regulations from time to time. As to questions raised with regard to quarantinable diseases, such as trachoma, the Board agrees with Colonel Bruce that special action should have been taken to obtain sanction for the return of such cases to Canada.

*XIX.—C.A.M.C. Personnel not used to Advantage*

The Board disagrees with the contention underlying Colonel Bruce's report that the services of officers and other ranks C.A.M.C. should be confined to Canadian troops. It does not accept the statement that Canadian medical units are not serving, except in a small proportion of cases, Canadian sick and wounded in France. The statement is found to be incorrect as regards the thirteen field ambulances, and as regards the casualty clearing stations and stationary and general hospitals, the Board considers it obvious that their employment on the line of communication necessitates their being used for all troops using that line. The Board is therefore of opinion that Colonel Bruce did not appreciate the need of trained experts at the base and in casualty clearing stations, and holds that a specially trained practitioner who can efficiently command a field ambulance is, as a rule, of more value at the front than as a specialist in a general hospital.

*XX.—Consulting Specialists*

The Board is agreed as to the desirability of appointing civilian practitioners of eminence as consulting physicians and surgeons to Canadian hospitals in the United Kingdom, but holds that the appointment of consultants to the Expeditionary Force is a matter for the decision of the Imperial authorities. (See IV, above.)

*XXI.—Discontent as to Promotion*

The Board dryly remarks that this source of discontent exists in all armies. It found no evidence that it was abnormal in the C.A.M.C. It considers that the initial error lay in giving no lower rank than that of captain to officers joining the C.A.M.C. It recommends that the ordinary rules of promotion be observed and the senior officer selected for promotion, provided he has all the necessary qualifications, and that all future first commissions be in the rank of lieutenant.

*XXII.—C.A.M.C. Training School*

The Board agrees with Colonel Bruce's statement that the C.A.M.C. training school has never been properly organized; it has



not yet been given an establishment, and only recently suitable accommodation. As it is in effect the dépôt of the Canadian Army Medical Corps overseas, the Board considers it of particular importance that it should be fully organized under an officer with practical experience in the field. It finds that efforts were made by the D.M.S. from time to time to get a suitable location and that no responsibility attaches to him, as he did not receive assistance or support from the authorities. It recommends that this important question should receive early consideration.

### *XXIII.—Economy in Management*

The Board does not agree that in the operation of the medical service sufficient attention has not been paid to economy in management; on the contrary, the various arrangements that have come to its knowledge have been generally most advantageous to the Canadian Government.

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## Canadian Medical Association

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### THE MONTREAL MEETING

THE Committee of Arrangements is now in a position to announce that Dr. F. J. Shepherd, of Montreal, has consented to deliver the Address in Surgery. This announcement we are sure will be welcomed by all the readers of the *Journal* and will, no doubt, go far towards ensuring a large attendance in the Surgical Section.

A provisional programme is in course of preparation and will be placed before our readers at an early date. It is the intention of the Committee to make a strong feature of the Military Section. The Chairman of that Section, Dr. A. Mackenzie Forbes, who has recently returned from the front, is in correspondence with many of our Canadian physicians now on active service, and he has already received promises of a number of interesting papers.

## Miscellany

### Book Reviews

**MANUAL OF OPERATIVE SURGERY.** By JOHN FAIRBAIRN BINNIE, A.M., C.M., F.A.C.S., surgeon of the Christian Church, the German and the General hospitals, Kansas City. Seventh edition, revised and enlarged. 1363 pages with 1597 illustrations. Publishers: P. Blakiston's Son & Co., 1012 Walnut St., Philadelphia, Price, \$7.50 net.

PROFESSOR BINNIE's book is now so well known, and has been so frequently reviewed, that it hardly seems necessary to say anything of a particular nature about it, except to repeat the thoroughly justified words of commendation which have greeted the appearance of the successive editions. The author has succeeded in making his book, not only one for the beginner in surgery, but also one for the finished surgeon. He strikes admirably the happy mean between conciseness and diffuseness. The bibliography is full and satisfactory. The present edition brings the work thoroughly up-to-date and includes a very timely article on war surgery. In this particular chapter, written by Walter S. Sutton, and occupying some thirty pages, one gets a very good account, with excellent illustrations, of many of the newer splints, so many of which have been devised during the war. It is certain that one of the great advances in general surgery, contributed by the experience of the war, has been in the way of improvement in splints; and the American Ambulance in Paris, (in particular Dr. Blake) has contributed a good deal in this direction. Naturally this chapter suffers in not including the progress of the last year in certain directions. Abdominal surgery, for instance, receives only two small paragraphs, whereas the progress made would justify a much larger space. One might reasonably quarrel with a few statements, such as that, in cases of gas gangrene "one should amputate at as low a point as possible," and that "one may with impunity pass through definitely infected tissue." To follow this advice would mean the sacrifice of many lives (according to the writer's

experience) for the sake of saving a few inches of limb. Again, the author seems willing in such cases to allow a cuff, that is a flap; whereas the best judgement at present is strongly in favour of the flap-less, or "sausage" amputation. Nothing is said, moreover, concerning injuries of the head in war. However, it is obvious that general discussion of such subjects might go beyond the limits of a book on operative surgery.

In general one must say that Dr. Binnie's book is cordially to be recommended.

**SYPHILIS AND THE NERVOUS SYSTEM : FOR PRACTITIONERS, NEUROLOGISTS AND SYPHILOLOGISTS.** By DR. MAX NONNE, chief of the nervous department in the General Hospital, Hamburg. Authorized translation from the second revised and enlarged German edition by CHARLES R. BALL, B.A., M.D., chief of the nervous and mental department, St. Paul Free Dispensary. 450 pages with 98 illustrations. Second American edition, revised. Publishers: J. B. Lippincott Company, Philadelphia, London and Montreal, 1916.

THE physician and particularly the public, do not realize the gravity of syphilis and thus do not appreciate the importance of its involvement of the nervous system. We are not treating syphilis correctly to-day, but are satisfied if all symptoms of the primary lesion clear up and if a negative Wassermann test of the blood is obtained. Nonne in his excellent book—the latest and most complete work on syphilis and the nervous system—reviews the whole subject from the pathology of the various lesions, the different forms of the disease, to the many methods of treatment. His classification is very clear and the manner in which he enunciates the different points of each class is excellent. He shows how syphilis may assume the most diverse forms of symptomatology and how a patient, even though he has had the best treatment known for the primary lesion, may later develop signs pointing to involvement of the nervous system. Any physician, who has anything to do with syphilis, should read this book and if he does, he will see the importance of doing a lumbar puncture on every person who has contracted the disease and also of not depending too much on the Wassermann test of the blood.

## Obituary

### HARRY GOODSIR MACKID, M.D.

THE following sketch of the life of the late Dr. H. G. Mackid has been prepared by Drs. H. A. Gibson and R. B. Deane, of Calgary, at the request of the Calgary Medical Society and has been forwarded to the JOURNAL for publication. A notice of Dr. Mackid's death appeared in the September number and we are glad now to be able to give fuller particulars of the life of one who for many years was an active and devoted member of the Association.

The death occurred at Calgary, Alberta, on the morning of August 19th, 1916, in the fifty-eighth year of his age, of Harry Goodsir Mackid, M.B., M.D., Tor.; F.A.C.S., L.R.C.P., Edin.; L.F.P. & S., Glasgow; L.M., Edin. and Glasgow. Dr. Mackid's death came as a great shock to thousands of people throughout the West, for while his health had been rather indifferent for some years he remained in active practice until the last, in fact the coma which carried him off was only discovered when it became necessary to awaken him in the morning for an operation that he had to perform at 10 a.m. Dr. Mackid had suffered for about six years from diabetes mellitus but despite the inroads of the disease, a well-ordered life, careful treatment and a stout heart had enabled him to preserve a mental and bodily vigour sufficient to cope with the somewhat onerous duties attaching to the position of Chief Surgeon of the Alberta Division of the Canadian Pacific Railway Company which he had occupied for several years.

Harry Goodsir Mackid was born in Goderich, Ontario, on August 19th, 1858, and came of Scotch stock, his father being a native of Edinburgh, Scotland, and a Presbyterian clergyman. His early education was received in Goderich whence he proceeded to Toronto University, where he graduated in medicine in 1879, being a college friend of the late Dr. Ferguson. He supplemented his professional education with postgraduate work in Vienna, Berlin, London, Edinburgh and Glasgow, and from time to time in later life revisited these old world centres of professional learning, being always keen to keep himself abreast of medical thought and practice. Dr. Mackid began practice in Lucknow, Bruce County, Ontario, continuing there until 1884, when he moved to Seaforth,



Ontario, where he stayed until 1889, in which year he came West to Calgary and remained here up to the time of his death. He was married in 1881 to Matilda Meyer, daughter of L.D. Meyer, Esq., Clerk of the Court at Seaforth. They are the parents of one son, Dr. L. S. Mackid, now a Major in the Canadian Army Medical Corps on active service in France.

Dr. Mackid was a Fellow of the American College of Surgeons, Past President of the Alberta Medical Association and of the Dominion Medical Association, a member of the consulting staffs of the Calgary General Hospital, Holy Cross Hospital, Calgary, and the General Hospital, Medicine Hat, and was Chief Surgeon of the Canadian Pacific Railway Company, Alberta Division. He served with the Queen's Own Rifles, Toronto, from 1876 to 1879, and was a town councillor in Lucknow in 1883, a member of the Calgary School Board from 1891 to 1892, and a member of Perfection Lodge A.F. & A.M. and Chapter R.A.M., Calgary. He was one of the most widely known men in the West, coming here in the early days when what are now the provinces of Alberta and Saskatchewan were called the North-West Territories, and he had perhaps the largest circle of friends of anyone in Alberta. Ever since coming West, owing to his official Canadian Pacific Railway position, he has been closely associated with railroad men and devoted most of his professional life to their service.

Dr. Mackid was an accurate observer, a clever diagnostician, and an expert operator. His leanings were distinctly surgical, and in the broad field of railroad surgery, where he had had for many years such unsurpassed facilities, his opinion was considered authoritative. Socially he was a delightful companion, full of bright sparkling wit, a good raconteur and a man who thoroughly enjoyed life's varied processes. In short he was a large hearted, broad minded man whose sudden demise has created a gap in the community in which he lived that will not soon be effaced.

### SIR FREDERICK WILLIAM BORDEN

SIR FREDERICK WILLIAM BORDEN died at Canning, Nova Scotia, on January 6th in the seventieth year of his age.

Although it is perhaps as the Minister of Militia and Defence, a position he occupied from 1906 to 1911, that Sir Frederick Borden is best known, he was educated for the medical profession and received the degree of M.D. from Harvard

University. He commenced to practise in 1868 and the following year was appointed assistant surgeon to the 68th Battalion of the King's County Regiment of Militia. He rose to the rank of surgeon lieutenant-colonel and honorary colonel in the Canadian Army Medical Corps, and in 1911 was appointed honorary surgeon-general in the Royal Army Medical Corps. He was elected a member of the House of Commons in 1874 as representative of King's County, Nova Scotia, the "Acadie" of Longfellow's *Evangeline*. Sir Frederick Borden held the honorary degrees of D.C.L. and LL.D. and was created K.C.M.G. in 1902. Upon the death of Lord Strathcona he was offered, but declined, the office of High Commissioner for Canada in England.

#### PROFESSOR JOHN A. HENDERSON

ON the 2nd of January, after an illness of only two days, Dr. John A. Henderson, Assistant Professor of Anatomy in McGill University, died at his residence in Montreal. Dr. Henderson was born at Paris, Ontario, on October 28th, 1868. His medical course was taken partly at Toronto and partly at McGill, from which latter institution he graduated in 1893, obtaining honours in all subjects and taking the final prize.

After graduation he was intern in the Montreal General Hospital for a year, after which he took up the practice of his profession in Montreal. In 1895 he joined the staff of the department of anatomy of McGill. His steady advancement to the post which he occupied at the time of his death is an indication of the value set upon his services by his colleagues in his own Department and in the Faculty of Medicine.

By his students and his intimate friends he was familiarly known as "honest John," and this simple title abundantly describes the character of the man. Honourable and upright to a degree, conscientious in the performance of his duty, he was a man of a type that can ill be spared by his college and by the community in which he lived.

DR. JOHN EDGAR KING died at Toronto on December 30th, 1916, after a long illness. He was born in Vaughan township in the province of Ontario and received his medical degree from Trinity College, Toronto. He was in practice for some years at Thistletown.

DR. S. A. ROSS, of Vancouver, died on July 10th, 1916. Dr. Ross graduated from McGill University in 1899. He had spent a year on active service and his death occurred a few months after his return to Canada.

DR. PETER LIVINGSTONE, of Detroit, who died suddenly on December 24th, 1916, was born in Nairn, Ontario, in 1865. He was a graduate of the University of Michigan and had been in practice as a specialist in diseases of the eye, ear, nose and throat at Detroit since 1907.

DR. C. L. WHEELER, who died at Brooklyn, New York, on December 30th, 1916, was born in Montreal on March 5th, 1864, the son of Dr. Thomas Brown Wheeler of Montreal, and a nephew of William Wheeler, a former Governor of the State of Rhode Island. Although Dr. Wheeler's professional career had been spent outside of Canada, he was well known to many Montrealers. He had been connected with the editorial staff of the *New York Medical Journal* since 1902, and had been editor of that journal since the death of Dr. Frank P. Foster in 1911. He was a man of great personal charm and many accomplishments, being gifted both in literature and music.

Claude Lamont Wheeler was educated in the public schools of Montreal and at the Universities of Laval and McGill. After receiving his B.A. Degree from the University of Laval, Quebec, he entered upon the study of medicine at McGill University, graduating in 1889. The following year was spent as an intern in the Royal Victoria Hospital, after which he went into private practice at Burlington, Vermont. From there he went to New York where he served in the Manhattan Eye and Ear Hospital and in the New York Polyclinic Hospital. Later he engaged in private practice, specializing in ophthalmology.

THE death of Dr. George R. Camp occurred at Sheffield, N.B., on January 14th, 1917. Dr. Camp was born at Jemseg, N.B., on February 5th, 1850. He graduated at Bowdoin Medical College in 1890 and began to practise at Sheffield the same year. The late Dr. Camp had been ill since August, 1916, with malignant disease of the stomach. Dr. Camp enjoyed a large practice. He was a shrewd diagnostician and an ideal family physician.

DR. JAMES H. COTTON, of Toronto, who died on January 9th,

had been in poor health for some years. He was born at Garafraxa on July 20th, 1849, and graduated from the University of Toronto in 1875. He subsequently spent two years in postgraduate work at the University of Edinburgh and returning to Canada began to practise in Toronto. He was a member of the staff of both Grace and Western Hospitals for some time. He is survived by a widow, one son and two daughters.

DR. HARRY GRAY FAIRBANKS, whose death occurred at Harcourt, New Brunswick, on December 1st, was a son of the late Mr. Edwin Fairbanks of Halifax, at one time deputy provincial secretary of Nova Scotia. Dr. Fairbanks graduated from Dalhousie University in 1895 and was in practice at Harcourt.

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## News

### MARITIME PROVINCES

THE annual meeting of the New Brunswick Board of Health took place at Fredericton on January 5th, when a revision of the regulations governing the quarantine of cases of infectious disease was decided upon and a committee appointed to consider the matter. The members of the committee are: Dr. L. M. Curran, of St. John, Dr. B. M. Mullin, secretary of the provincial board of health, and Mr. Daniel Mullin, K.C., of St. John.

THE provincial sanatorium at Kentville, Nova Scotia, is to be enlarged to provide accommodation for one hundred soldiers who have returned from the front.

It is reported that several cases of smallpox have occurred at Bungay, Prince Edward Island.

### ONTARIO

A SATISFACTORY report of the year's work was submitted to the Ottawa Board of Health by Dr. Law, the acting medical officer of health, at the annual meeting on December 13th. The present population of Ottawa is estimated at 100,561. The total number



of births registered during 1916 was 2,542,—a birth rate of 24.20 per 1000. The average death rate was 15.34:1000. One hundred and eleven deaths from pulmonary tuberculosis were reported, an improvement upon 1915 when 133 deaths were caused by this disease. Diphtheria, too, was somewhat less prevalent than during the previous year, the deaths from the disease numbering 32 as compared with 53 in 1915. Ottawa did not escape the epidemic of measles which spread practically all through the country, but out of 869 cases reported only 8 deaths were registered. The situation as regards typhoid has been particularly satisfactory since only 12 cases—of which 4 were fatal—were reported in the city. The total number of deaths of children under one year of age was 566, an increase of 59 over last year. However, 132 of these infants died at the Foundling institution to which babies are admitted from all the districts surrounding Ottawa, so that these deaths should not be included in the Ottawa figures. With this deduction the infant mortality was 171:1000.

DR. KENDALL, house surgeon at the Ottawa Isolation Hospital, has resigned.

DR. ROBERT MACGREGOR, of London, Ontario, has been appointed prison physician at the Jackson Penitentiary, Michigan. Dr. Macgregor was recently pardoned after four years' imprisonment on a conviction of murder.

DR. J. G. WRIGHT, formerly of the staff of the Rockwood Hospital for the Insane, has been appointed to succeed Dr. Body as medical superintendent of the Kingston General Hospital.

THE following is the list of contagious and infectious diseases reported in the province during December: smallpox, 4 cases; scarlet fever, 149 cases, 4 deaths; diphtheria, 438 cases, 38 deaths; measles, 449 cases, 2 deaths; whooping cough, 189 cases, 5 deaths; typhoid fever, 63 cases, 8 deaths; tuberculosis, 149 cases, 70 deaths; infantile paralysis, 5 cases, 1 death; cerebro-spinal meningitis, 9 cases, 7 deaths.

THE Ontario Health Officers' Association will meet in Toronto on Tuesday and Wednesday, the 29th and 30th of May, 1917.

THE following candidates have been successful in passing the

examinations of the Ontario College of Physicians and Surgeons and have received license to practise in that province: James Franklin Adams, Hanover; Frederick G. Bantling, Alliston; William W. Barraclough, St. John, N.B.; George W. Beaver, Lewiston, N.Y.; Henry Norman Bethune, Toront; Charles Noble Black; Toronto; William Albert Blake, Hamilton; Frank Hubert Boone, Toronto; William Easson Brown, Toronto; Chas. M. Burroughs, Winnipeg; Beaumont Sandfield-Cornell, Athens; Gordon Murray Dobbin, Toronto; Thomas Lorne Dobson, Utonia; John S. Douglas, Dunnville; Hugh Alexander Elliott, Midland; Charles Farquharson, Agincourt; Douglas Gordon Findlay, Toronto; Donald R. Finlayson, Lucknow; Victor Percy Fleming, Hamilton; Charles Elias Frain, Norwich; Ruggles George, Toronto; Joseph A. Gilchrist, Toronto; Roy John Hardstaff, West Devonport, Tasmania, Australia; Frederick W. W. Hipwell, Alliston; Edgar R. Hutchinson, Sarnia; Arthur Isaacson, Toronto; William G. Jamieson, Camborne; Andrew Murray Jeffery, Toronto; Fred Macnab Johnson, St. Thomas; Wilfred J. Johnston, Craigvale; Charles S. Macdougall, Kincardine; Angus MacKay, Woodstock; Robert MacKinlay, Camlachie; Donald Stirling MacLennan, Albert Montgomery, Toronto; Virgil P. MacMahon, St. Catharines; Cecil Verner Mills, Corunna; James Clarence McClelland, Toronto; Emerson C. McFarlane, Stratford; Thomas Vincent Plews, Cobourg; Ernest Aikens Richardson, Toronto; George Raymore Scott, Peterboro; Clarence Morley Sellery, Cobourg; Wilmot E. L. Sparks, Toronto; J. Cameron Smith, Lakefield; William Pelton Tew, Oil Springs; Newton Oscar Thomas, St. Thomas; Charles E. Thompson, Hamilton; Thomas Edmond White, Hamilton; Harvey John Wildfang, Elmwood; Harry C. Robertson, Toronto.

### QUEBEC

THE twenty-second annual meeting of the Board of Governors of the Royal Victoria Hospital, Montreal, took place on January 16th, 1917. It was reported that patients to the number of 6,075 had been admitted to the hospital during the year, of whom 1,794 received free treatment, 2,566 were admitted to the public wards, and 1,715 had private rooms; 4,556 were residents of Montreal and 1,519 resided in neighbouring districts. The average number of days spent in hospital by patients was 20, and 123,967 days of treatment were given, as compared with 107,927 in 1915. Deaths to the number of 295 occurred during the year, the percentage being 4.9, or, if those which occurred within forty-eight hours of admission

were deducted, 3-07. The average cost of maintenance for each patient was \$2.18 a day, seven cents less than during the previous year.

THE Board of Governors of the Western Hospital, Montreal, held its forty-fourth annual meeting also on January 16th, when the president, Mr. D. Lorne McGibbon, was able to make the satisfactory announcement that although 1916 had been the busiest year in the history of the hospital, the overdraft at the bank had been reduced from \$46,000 to \$17,000, the sum of \$60,000 having been subscribed during the campaign for funds conducted a few months ago. The present buildings are not large enough to meet the increasing requirements, and a committee has therefore been appointed to consider the best means of dealing with the situation. The average daily cost of maintenance during the year was \$2.47 for each patient. The number of admissions to the hospital was 1,567 including 1,413 residents of Montreal. Twenty-eight deaths occurred, the percentage being 2.77. In the outdoor department treatment was given to 18,225 cases. Dr. Peter S. Campbell, of the resident medical staff, is acting medical superintendent of the hospital during the absence of Dr. Alan F. Argue, C.A.M.C., medical officer of the 244th Battalion.

A DISASTROUS fire occurred at St. Ferdinand de Halifax in the province of Quebec on Saturday, December 30th, when the asylum convent and church were burnt to the ground. The extreme cold added to the miseries of the situation, the temperature being below zero at the time, and it was with great difficulty that the rest of the village was saved. One hundred and thirty-nine patients were rescued from the burning asylum building but, unfortunately, it was impossible to save them all and forty-two met their death. The difficulties of rescue were tremendous owing to the inability of the insane patients to understand the danger or to obey orders given by the Sisters in charge, one of whom died of suffocation in a brave attempt to reenter the building. A number of congenital idiots were confined in a part of the asylum to which it was impossible to get in time to save them all; however, fourteen of these helpless imbeciles were carried to safety by the Sisters.

## ALBERTA

DR. H. W. WALL, of Donalda, is spending the winter with his family in Southern California.

A MUNICIPAL hospital was opened at Bassano, near Calgary, on December 19th by the Honourable Wilfrid Gariepy. Dr. G. A. Scott is the medical superintendent of the hospital.

## MEDICAL COLLEGES

*Dalhousie University*

ON December 23rd, the Senatus Academicus of Dalhousie University held a special meeting for the purpose of conferring the degrees of M.D., C. M. upon the following gentlemen who have volunteered for active service overseas:

Donald St. Clair Campbell; John George Duncan Campbell, John Angus Davies, Charles Knowles Fuller, Dexter Scott McCurdy, Wilfred Murray MacDonald, Kenneth Grant Mahabir and Douglas William Norman Zwicker.

These Fifth Year students had taken advantage of the Special War Emergency Session from May 1st to December 31st, 1916 offered by the University acting under the advice of the Medical Department of the Militia authorities at Headquarters.

Recognising the patriotic motives actuating the University and the students, the Provincial Medical Board of Nova Scotia heartily coöperated with the University in holding an extra-ordinary joint special Final Examination in the end of December to enable the successful candidates to obtain their degrees and Provincial Licences by the end of the year and so enter at the earliest possible moment for the course of Military Instruction preparatory to their going overseas.

The report of the examiners showed that the graduating class had attained an exceptionally high level of distinction.

## ARMY MEDICAL SERVICES

MENTION has already been made in the JOURNAL of the award of the D.S.O. to Major Philip Burnett, C.A.M.C., of Montreal, for conspicuous gallantry and devotion to duty in the field. The official notice of the award states: Major Burnett "took over the command of the bearers at the front, and for forty-eight hours



carried out his duties with great skill and determination under very heavy fire." Major Burnett, who is lecturer in dermatology in the faculty of medicine of McGill University and dermatologist to the Royal Victoria Hospital, Montreal, organized No. 6 Field Ambulance in Montreal in the spring of 1915 and went overseas as second in command of that unit. He has been on duty with his unit ever since and is now in France.

The D.S.O. has also been conferred upon the following Canadian medical officers :

TEMPORARY COLONEL ARTHUR EVANS SNELL, C.A.M.C.

LIEUTENANT-COLONEL WILLIAM WEBSTER, C.A.M.C.

LIEUTENANT-COLONEL ROBERT PERCY WRIGHT, C.A.M.C.

Dr. Webster has been at the front for more than a year and is in command of an ambulance corps, which was mobilized in Winnipeg under his direction.

Dr. Wright went overseas with the First Field Ambulance, C.E.F., of which he is now in command. He graduated from McGill University in 1908.

THE following Canadian medical officers have been decorated with the Military Cross by His Majesty the King for conspicuous bravery on the field of action:

LIEUTENANT WILLIAM NORMAN GILMOUR, M.D., R.A.M.C., of Brockville, Ontario, who "gallantly dressed a wounded man lying in No Man's Land and finally brought him in with great courage under very heavy fire." Lieutenant Gilmour is a son of Mr. and Mrs. W. A. Gilmour of Brockville; he has seen much heavy fighting on the Somme front as medical officer of the 16th Royal Scots. He graduated from McGill University in 1910, served a year as house surgeon at the Children's Memorial Hospital, Montreal, and two years as surgeon on an Atlantic liner. He then went to Australia and from there to South Africa where he went through the German South West African campaign, at the end of which he joined the Royal Army Medical Corps and was appointed medical officer of the regiment with which he is now serving. He has since been promoted to his captaincy.

CAPTAIN ANGUS ALEXANDER DRINNAN, C.A.M.C.

CAPTAIN FREDERICK WILLIAM LEES, C.A.M.C., of Eburne, British Columbia, medical officer of the 7th Battalion of the First Canadian Division. Dr. Lees was born at Fallbrook, Ontario, and graduated from McGill University in 1908.

CAPTAIN GEORGE GARNET GREER, M.D., C.A.M.C., of Peterborough, Ontario. "For conspicuous gallantry and devotion to duty. He tended and dressed the wounded for two hours in the open under intense fire. On several occasions he rescued wounded men in the open by carrying them on his back. He has previously done fine work.

CAPTAIN ROBERT MARSDEN LUTON, C.A.M.C.

CAPTAIN JAMES ERNEST McASKILL, C.A.M.C.

CAPTAIN WILLIAM FREEMAN NICHOLSON, C.A.M.C.

CAPTAIN (acting Major) PAUL POISSON, C.A.M.C.

CAPTAIN WALFORD DOUGLAS SOMERLED RORISON, C.A.M.C.

CAPTAIN LLOYD REMINGTON MEECH, R.A.M.C., formerly of the C.A.M.C., who "worked forty-eight hours under heavy fire collecting the wounded."

TEMPORARY LIEUTENANT CHARLES STUART WYNNE, M.B., R.A.M.C., of Toronto, medical officer of the 12th Middlesex Imperial Regiment, was awarded the Military Cross "for conspicuous gallantry and devotion to duty" at the battle of Thiepval. "He worked all night tending and dressing the wounded in the open, thereby saving many lives. Later, he carried out his fine work continuously for three days."

THE following officers of the Canadian Army Medical Corps were recently mentioned in despatches by Field Marshal Sir Douglas Haig, commander-in-chief of the British forces on the western front:

COLONEL GILBERT LAFAYETTE FOSTER, C.B.

COLONEL ARTHUR EDWARD ROSS, C.M.G.

COLONEL HERBERT STANLEY BIRKETT, C.B.

LIEUTENANT-COLONEL R. J. BLANCHARD.

LIEUTENANT-COLONEL E. B. HARDY.

LIEUTENANT-COLONEL H. M. JACQUES.

LIEUTENANT-COLONEL C. A. PETERS.

LIEUTENANT-COLONEL W. WEBSTER, D.S.O.

LIEUTENANT-COLONEL R. P. WRIGHT, D.S.O.

LIEUTENANT-COLONEL T. W. YOUNG.

MAJOR E. H. BLAYLOCK.

MAJOR P. BURNETT, D.S.O.

MAJOR L. C. HARRIS.

MAJOR A. E. SNELL, D.S.O.

CAPTAIN N. J. BARTON.

CAPTAIN R. H. HARDISTY.

CAPTAIN H. HART.

CAPTAIN R. ST. J. MACDONALD.

CAPTAIN D. E. ROBERTSON.

CAPTAIN S. G. ROSS.

CAPTAIN W. H. SCOTT.

CAPTAIN J. P. WALSH.

*Non-commissioned officers.* Quartermaster-sergeant H. G. Iliffe, Sergeant E. C. Amaron, Sergeant C. W. McGill, Sergeant A. J. Quinn, Corporals T. Dale, W. Agnew, A. Donaldson, C. R. Grinham, W. E. Hewitt, Lance-corporals B. James and J. McLaren.

*Nursing Sisters.* Sisters A. Baillie, G. Billyard, R. Davies, A. R. Hinchey, F. H. McLeod, M. F. Parkins, L. Pidgeon, M. Robertson, B. L. Smellie.

THE Military Medal has been awarded to the following members of the Canadian Army Medical Corps: Sergeant R. Cameron, Corporal A. Hogg, Privates J. Blair, J. E. Blaney, W. Blaney, J. Bois, A. Bowie, and E. C. Caldwell.

DR. LEO BLAGDON, of Quebec, has been appointed Assistant Director of Military Hospitals, Paris, France. Dr. Tufster, of Paris, is the Director.

THE Royal Red Cross of the first class has been awarded to Matrons A. J. Hartley, L. M. Hubley, V.C. Nesbitt, E. C. Rayside, and F. Wilson, of the Canadian Army Medical Corps. The same decoration, second class, has been conferred upon Nursing Sisters A. D. Allen, A. Dickson, F. Ellwood, M. Hare, F. A. Hunter, and J. M. MacDonald.

DR. W. W. CHIPMAN, of Montreal, has been appointed to assist Lieutenant-Colonel Thompson, M.P., the medical officer of the Military Hospitals Commission.

MAJOR G. G. CORBET, C.A.M.C., of St. John, New Brunswick, has returned from the front and is now in command of a field ambulance depôt at St. John.

CAPTAIN A. E. LUNDON, C.A.M.C., is medical officer of the Indian Royal Horse Artillery.

COLONEL H. KEMMIS BEATTY, C.A.M.C., has been appointed

A.D.M.S. at Brighton, England, in succession to Lieutenant-Colonel Watt who has been transferred to London.

CAPTAIN J. N. MACRAE, C.A.M.C., of Galt, Ontario, late adjutant of the 34th (Western Ontario) Battalion, is now acting adjutant of the Central Military Hospital at Shorncliffe.

COLONEL PROWSE, C.A.M.C., of Winnipeg, is the Commanding Officer of the Patricia Convalescent Hospital recently opened at Ramsgate.

CAPTAIN HAIG, C.A.M.C., of Belleville, Ontario, has been appointed medical officer of the 235th Battalion.

THE following doctors have left Canada for overseas service: Dr. John Bunfield of Ottawa, Dr. A. H. MacLaren of Calgary, Drs. A. E. Cantelon, L. A. Knight, J. S. Sutherland, S. K. Shirton, S. C. Wilson, E. P. Whelpley, P. J. O'Dwyer, A. L. Shanks, and R. W. Guillemette, of Winnipeg.

It is announced that a further investigation is to be made into the administration of the Taplow Hospital and that Colonel Harwood has been appointed president of the Board of Enquiry.

THE third meeting of the Canadian medical society recently formed in France took place on November 6th, in the lecture hall of the medical faculty of Paris University under the presidency of Lieutenant-Colonel François de Martigny. Professor Bérard read an interesting paper on the treatment of wounds of the knee in war.

THE Distinguished Conduct Medal has been awarded to Sergeant A. E. Wartman, Corporal L. Bradley, and Private R. S. Collin, of the Canadian Army Medical Corps.

CAPTAIN W. S. HARPER, C.A.M.C., of Madoc, Ontario, who was medical officer of the 155th Battalion, has been appointed to the Headquarters Staff at Ottawa.

DR. FRED BURNHAM, of Winnipeg, has left England for Macedonia, where he will take command of the Serbian Military Hospital. Dr. Burnham saw service with the British Red Cross in Montenegro and was attached to the staff of a base hospital there at the time of the Montenegrin retreat. He has on two occasions been decorated by the King of Montenegro.



## CASUALTIES

*Died*

COLONEL CHARLES W. F. GORRELL, C.A.M.C., of Ottawa, formerly Officer Commanding the Duchess of Connaught Canadian Red Cross Hospital at Taplow.

LIEUTENANT-COLONEL R. C. McLEOD, C.A.M.C., Officer Commanding No. 9 Stationary Hospital, C.E.F., died of meningitis in London on January 6th, 1917.

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**Medical Societies****HAMILTON MEDICAL SOCIETY**

THE annual meeting of the Hamilton Medical Society was held in the Royal Connaught Hotel on December 6th, and took the form of a business meeting followed by an informal supper and smoker. The election of officers for the year 1917 resulted as follows: president, R. Y. Parry; vice-president, Dr. Forde McLoughlin; corresponding secretary, Dr. Fred Harper; recording secretary, Dr. D. A. MacRobbie; treasurer, Dr. T. W. Blanchard.

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**HALIFAX MEDICAL SOCIETY**

THIS Society met on Wednesday, December 13th, at the Military Hospital, Halifax, Professor Fraser Harris in the chair. Several interesting cases were exhibited. Dr. A. J. Nicholls, Professor of Pathology, demonstrated the egg cases of the larval store of the *Bilharzia parvula* in the urine.

Dr. Chisholm demonstrated the final results of the very successful operations on the legs and feet of the men enlisted from the West Indies who were attacked by frost-bite on board ship. Dr. Chisholm and Dr. Carston performed the majority of the amputations: the stumps have been found admirably adapted for fitting to the artificial limbs. An interesting case was one of shell-shock with cortical deafness of some months' duration.

On January 19th the Society entertained Colonel (Dr.) Hugh Cabot, professor of surgery at Harvard University to lunch on the occasion of his visit to lecture before the Canadian Club. Dr. Cabot is in command of the Harvard surgical unit serving in France with the B.E.F. Professor Fraser Harris,

president of the Medical Society, was in the chair. There was a large gathering of representative medical men. Amongst the guests were: His Honour Lieutenant-Governor Grant; the President of Dalhousie University, the American Consul-General; the President of the Canadian Club; the Hon. Mr. Justice Russell, Dr. W. W. Kenny, superintendent of the Victoria General Hospital. Dr. Cabot, in replying to the toast of his health, gave a most interesting and detailed account of the new surgery being followed out at the War. He described, compared and criticised the method of Cassel and of Wright especially from the standpoint of the newer methods of disinfecting wounds. It appears that dry dressings are inapplicable, the microorganisms of tetanus and of gas gangrene having gained access to every wound. The soil and clothing is highly infected with anærobes. In the evening Dr. Cabot addressed a large gathering of the Canadian Club of Halifax. His subject was: "The effect of the War on the British Empire as a Whole." From first-hand observation the lecturer gave a masterly review of the war, and ventured on an encouragingly optimistic forecast.

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#### PETERBOROUGH MEDICAL SOCIETY

A MEETING of the Peterborough Medical Society was held on December 14th, with a very large attendance of the members.

The paper of the evening was given by Dr. Ford of Norwood, and was entitled "An analysis of three thousand cases of confinement." A discussion was opened by Dr. Scott, and carried on by Drs. Greer, McCulloch, Cameron and Clinton. A hearty vote of thanks to Dr. Ford was proposed by Dr. Amys, seconded by Dr. Eastwood.

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The first meeting of the Peterborough Medical Society for the year 1917 was held on January 11th, and in spite of the very cold and stormy night, a large number of the members gathered to hear the papers given by Drs. Detweiler and Mann, of Toronto University, which were very much appreciated. A vote of thanks was proposed by Dr. McCulloch, seconded by Dr. Morgan. The next meeting will be held on February 8th.

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#### THE MONTREAL MEDICO-CHIRURGICAL SOCIETY

THE first meeting of the Society during the present session was held Friday October 6th, 1916, Dr. W. S. Morrow, the new president, in the Chair. The address of the Retiring President and the annual report of the Secretary were read. Resolutions of

condolence were passed on the death of Dr. G. Wilkins, a past president of the Society, and Lieutenant-Colonel R. P. Campbell who was killed on active service, for ten years treasurer of the Society.

After the address the meeting took the form of an informal smoker.

The second regular meeting of the Society was held Friday, October 20th, 1916, Dr. W. S. Morrow, president, in the Chair.

In view of the appearance of several cases of acute anterior poliomyelitis in Montreal, the regular programme of the evening was changed to take the form of a symposium on that subject.

Dr. A. D. Blackader opened the symposium with a paper on the historical data of the subject, Dr. C. F. Martin reviewed the subject to date and Dr. A. MacKenzie Forbes discussed the subject from the standpoint of the surgeon. These papers are published in the foregoing pages of this issue.

DISCUSSION: Dr. H. B. Cushing: It might be of interest to say a few words on the cases as presented at the Alexandra Hospital since August, 1916. About the first of last August Health Department of Montreal asked the Alexandra Hospital for accommodation for cases of infantile paralysis which might occur, and a ward was set aside for this purpose. On the 9th of August the first case was admitted and from then to the present there have been twenty-five definite cases in the ward. The care of this ward was assigned to myself and I thought it might be of interest to the Society if I said a few words on the features of these cases which have occurred within the last two months. As to the part of the city from which the cases were derived I have here a map showing the locations—the red pins represent the cases sent to the hospital, the blue pins cases which I have heard of and which have been reported to the papers and not sent to hospital. The map shows that there was more or less definite evidence of contagion, that is, cases occurred in groups close together; one on one street, ten days later another almost across the road and still another later in the same locality, and we could almost assume as positive that there was infection from one to the other. On one street there were eight or nine cases within a few days of each other. In only one instance was there a history of two cases in one family, the second case was admitted to the hospital and there was a definite history that the other child had had the disease ten days before. Twenty-three of our cases

were under five years of age, the other two were in young adults. The analogy between this disease and diphtheria is striking as seen at the Alexandra Hospital. In diphtheria the bulk of the cases are under school age, it is exceptional to get a history of exposure and exceptional to have more than one child in a family with diphtheria. This is exactly the same with poliomyelitis; even its method of infection through the nose and throat being similar. Early diagnosis is a fairly difficult matter unless flaccidity is present. Four of the cases admitted to the Alexandra Hospital eventually proved not to be poliomyelitis. In one child there was fever and loss of power in one leg, but this turned out to be a tuberculous knee and not paralysis. When we have these doubtful cases and it is a question of sending them to the hospital the seriousness of any error becomes obvious. This absence of any definite sign by which we can swear to a case is a very serious problem; the paralysis is the only sign which we can rely upon as pathognomonic. In the cases we had at the Alexandra the paralysis always appeared on the third day. As to the symptoms, in only seven was there a history of vomiting at the onset; the rigidity of the neck was noted definitely in half the cases; only two of the cases had convulsions, not more than you would expect in any febrile disease in children, these ran a relatively mild course afterwards and went on to complete recovery. In quite a few of the cases there was profuse sweating continuing for a number of days; whether this was due to the fever alone or some vaso-motor disturbance I could not say. I was surprised to find how high and how continuous was the course of the fever; in one it lasted about three weeks altogether, in another the patient finally died of hyperpyrexia. There was paralysis in sixteen cases of more than one extremity, in nine only one was involved. Pain was a marked feature. This did not seem to be a true hyperæsthesia, at least of the skin, but more a pain on movement of the limb and referred more to the joints, as if the relaxation of the muscles caused any movement to give pain. If you move the paralysed extremities at all it causes the children to cry out, and nursing is most difficult on account of this symptom. Dr. Martin mentioned that they usually lie on their side to protect the neck; that was not my experience as the nurses reported that it was very hard to get the patient to lie on the side, as pressure of one limb on the other gave rise to pain. There were five deaths out of the twenty-five cases, or a percentage of twenty. All the deaths occurred directly or indirectly as the result of a paralysis of the respiratory muscles. One thing to



which I might draw attention was that it was the most cheerless ward I ever attended. The patients suffered great pain, there was extreme difficulty in handling them on this account, many cried constantly and did not sleep at night, or if they did sleep they would wake up at very short intervals crying. There was no treatment which seemed efficacious at all and the children who did not die went out at the end of the time in a condition not much improved from the time they came in. Again, the cases which had signs of difficult breathing lingered on from day to day and finally died practically from suffocation. This altogether made a gloomy picture and the nurses in the ward suffered in regard to their nerves while attending these little patients. One point that appealed to me was the evidence of the virulence of the disease. I had seen previously in hospitals scattered cases of poliomyelitis but the virulence of the present cases seemed very much worse than that of cases of other years; the fever is more prolonged, the paralysis more extensive and the mortality is greater.

Dr. Cushing presented a brain and cord from one of the cases showing the typical lesions.

Dr. S. Boucher: I was very pleased to receive the invitation of this Society to be present to-night and accepted with great pleasure. I have enjoyed exceedingly the papers which I have had occasion to hear and now feel much more encouraged than I did when I came in. The announcements made of the extreme difficulty in making a correct diagnosis of this disease make the outlook dark and it may be necessary to consider as cases of poliomyelitis all kinds of infection in young children which have these vague symptoms, until a correct diagnosis is made. In consequence of this the attention of physicians will be called to the danger of spreading this disease if left undiagnosed, and suspicious and doubtful cases will be more carefully reported. I have prepared a few figures about the situation as it stands now in Montreal. For the year there were reported to the Board of Health sixty-seven cases, as follows:

January.....	0
February.....	2
April.....	1
May.....	1
June.....	2
July.....	2
August.....	10
September.....	21
October .....	28

Among these cases twenty-eight are now under treatment, eleven are in hospital and seventeen at their homes. According to the reports there have been twenty-two deaths. As to age, there have been:

Under 6 months.....	3 cases
from 6 months to one year.....	9 cases
from 1 year to 18 months.....	5 cases
from 1½ to 2 years.....	9 cases
from 2 to 2½ years.....	11 cases
from 2½ to 3 years.....	8 cases
from 3 to 3½ years.....	5 cases
from 3½ to 4 years.....	3 cases
from 4 to 4½ years.....	6 cases
from 5 to 6 years.....	1 case
from 6 to 6½ years.....	1 case
from 6½ to 7 years.....	1 case
from 7 to 8 years.....	1 case
from 8 to 11 years.....	1 case
from 11 to 12 years.....	1 case
from 22 to 23 years.....	2 cases

Amongst these sixty-seven cases you will notice that but eight were over five years of age, all the other cases were under. Among all those children there was only one attending school, a small private school, and no other case developed there according to the reports.

The measures we have taken to prevent the spread of the disease were based on what has been done in New York. We have taken the report of the New York Board of Health and have followed as far as possible their action in this matter. We did not take up the matter of pet animals in the houses, though we might have done so to advantage. Opinions vary but we, as a Board of Health, must in every case take the safe side and on account of this we ask every physician in the city of Montreal to report all cases to us, doubtful or otherwise, as soon as possible. I put the matter before the Board of Control of the city so that we might have power to do everything in a thorough and satisfactory way, so that in the examination of cases that will be reported, especially if they are doubtful, I shall ask the Universities of Laval and McGill to choose one or two of their members to confer with the Officers of the Health Department. You are aware of the precautions taken by the Department for cases confined in their homes but I must ask you, because we need very much your help in that way, to be very careful to give as much explanation as possible to the families as to the precautions that they have to take. You could

do in that way much more than we can. We cannot be with the people all the time; you see them often, and I would ask you to be insistent in the carrying out of your instructions and also those of the Health Officers. As far as possible I ask you to send the patients to the hospital, in this way it is much easier to prevent the spread of the disease than when they are treated in their homes; we cannot keep a watchman at every house all the time and the hospital is certainly the best place for such cases.

Dr. J. A. Hutchinson: I have only a few words to say about our outbreak in Westmount. At the outset I would mention that one of our members, Dr. Patch, has lost a child, a victim of the present outbreak, and I am sure the members of this Society all feel sympathy for him. We in Westmount have for some time had the usual number of scattered cases that a place of this population would have, but a sudden outbreak occurred a week ago, not perhaps so serious in number as in virulence; four cases developed in one day and three died. The School Commissioners, without waiting for any Board of Health to take action dismissed the schools and took other precautions. In order to satisfy everybody the Board of Health went on the principle of doing everything that it was possible to do, whether some of the things that were done were in excess of anything that was required or not. There are a few things that occurred that might be of interest. In a family where a death took place quite suddenly, the doctor told me that two other children in that family were ill, and had been ill for some time, but it had not occurred to him that they had had poliomyelitis until the death of this child convinced him that they must have been infected though they had not gone on to paralysis. This showed that such cases might occur and that the best physicians in the city might not be able to say that they were poliomyelitis. From this it would seem that in a city where there have been at least sixty-seven cases of genuine poliomyelitis, one may conclude that there may have been many others which did not go on to the extent of being paralysed but may have the disease and communicate it to others. Therefore, in reckoning up the number of cases we have only the actual cases which are paralysed. Another feature is that, though we have sixty-seven cases reported by members present to-night, there are other English physicians who are not here to report, and there is a very large body of French physicians from whom also we have not heard. The cases reported have occurred chiefly in the higher level of the city showing that this is not a

disease that is much influenced by slums or insanitary conditions of a large city, the majority having been in homes where there is every sanitary facility.

Dr. G. G. Campbell: The slips passed around to the members to-night asking for the number of cases seen by them during the past three weeks show that there were sixty cases, fairly evenly distributed and there are eight or ten cases reported as doubtful. There are in the room to-night probably less than 100 physicians who are likely to come in contact with such cases. This showing is a most important matter at the present time and it is possible it is not taken quite seriously enough by our Health Authorities. It is easy to be wise after the fact but to take precautions now when some good might be done by it is most desirable. I have listened to what Dr. Boucher has said, and if that can be carried out I have no doubt it would help; but, for instance, during the present week in the Outpatient Children's Department of the Montreal General Hospital there were two cases of poliomyelitis, undoubted cases, the paralysis being present when seen on Monday of this week. These were both reported to the Health Department and the Department took what they considered the necessary steps to look after the cases: much to my surprise, however, on Thursday, when the Children's Clinic again opened, one of the same babies appeared at the clinic. How much damage she might have done in that outpatient department with twenty or thirty ailing children in the same corridor it is hard to estimate. It seems to me the only way to guard against such stupidity is to have such cases placed immediately in a hospital. The mother of the child told us that the City Health man had explained things to her, but she evidently did not understand the necessity for staying at home. With people of that class it is absolutely necessary to send the children to a hospital and the health officials should have authority to do so. About the disease itself, it has been my misfortune to have had seven paralytic cases with three deaths. Once I knew that the disease was prevalent I felt that one was bound to look upon every case of unexplained fever and illness in a child as possibly poliomyelitis. On the other hand if there is only one case in the family, as happened in three or four of my unexplained doubtful cases, would I be justified in reporting that and in quarantining that family for six weeks? The diagnostic symptoms that Dr. Martin has drawn attention to are easy to obtain in older individuals. In two cases of nine and eleven years, one could test the difficulty in bringing the chin down on the sternum and it was



present in these cases, but in children of two or even up to five years who are ill and irritable, one cannot get much out of them at the best of times and therefore cannot depend very much upon such symptoms. In such children there are few if any symptoms to be relied upon before the paralysis sets in. In one case, for instance, there seemed to be a regular gastro-intestinal upset in a baby with a strong suspicion of the milk as a possible cause; in another, which lasted only a couple of days, there was nothing but fever and lassitude in a baby under three years; in the third, in the same family, there was an unexplained temperature for two or three days, reaching 106°F., and three hours before death respiratory paralysis set in and death took place with hyperpyrexia. This is the time to try to do everything in our power to have the cases recognised and to prevent the spread of the infection. I have no hesitation in saying that the most dangerous sources of spread of the disease are the moving picture theatres. An interesting example occurred in one of my cases. Two young boys, who had not been together for some time previously, went to a moving picture show a week before I was called to see one of them; they had not been together since and did not live in the same district, yet both developed poliomyelitis the same day and both died within forty-eight hours. All collections of children, younger children particularly, in schools churches, Sunday schools, on street cars and play grounds, should be discouraged until we see just where we stand.

Dr. D. F. Gurd: An interesting fact in connexion with the recent cases is that they occurred within a day or two both in Montreal and Westmount. There may be a possible reason for this and it is being investigated at the present time. It certainly looks as if some common source of infection were present to cause these cases within forty-eight hours or so of each other. We have all learned a very great deal from Dr. Martin's address. He mentioned that the germ was supposed to be resistant to heat, dry heat; I would like to ask if he could inform us whether boiling or pasteurizing milk would kill it. Years ago no precautions were taken with cases of poliomyelitis. For the last thirty-five years I have seen and treated an odd case every year or two and they were seen in homes where there were other children and a second case never developed. The disease seemed to strike like lightning—here and there, and never twice in the same place. A peculiarity of these odd cases was that they occurred not only in the city but also in the country. One was that of a boy of ten, one of a large family, who had been six weeks in the country (Bark Lake) and who was sud-

denly stricken and brought to the Royal Victoria Hospital where he died an hour or so after admission from paralysis of the muscles of respiration. Five years ago another boy a day or two after coming to Montreal from Lac Manitou, died from ascending paralysis. No other cases existed in this north country. Causation is obscure and cannot be traced in the above cases to contact. I believe that isolation and all other precautions should be taken but the fact remains, and Flexner made the statement in a recent report, that it is not very infectious—not nearly so much so as “measles, scarlet-fever, or diphtheria.” This the older physicians can verify from their experience, as I said before in no case did a second child take the disease although they went in and out of the sick room. It is only within the last ten years that strict precautions were advised to prevent contagion spreading.

Dr. F. C. Gilday: New York city has had a very sad experience with this disease; they have found that in the acute stage they know nothing about it and in treatment they do not know anything but they have found out that all cases should be isolated and put under proper care; the after-treatment is the principal thing in anterior poliomyelitis. There are to-day distributed throughout New York City various institutions that can treat from seven to eight hundred cases and the best results have been obtained among the poorer class that go to these hospitals; the rich, treated at home, have the higher mortality. They keep these children there up to six months or a year. No active treatment is permitted until all symptoms have subsided, the longer it is left the better the result. Electricity aggravates the condition and prevents recovery. In the course of two months they know definitely the muscles that are paralysed and they then begin the education treatment, not the ordinary massage but the education and proper massage of muscles in the proximity to the paralysed muscle; get the child if it has a drop foot to work it every day and prevent deformity; watch the case. They are getting good results from that procedure and it has to be followed out in a scientific manner. These cases should be kept in hospital until all chance of deformity is prevented. Cases which leave early, untreated, will return to the outdoor departments of our hospitals probably for years; this can be prevented by proper supervision and if we are in for any kind of an epidemic here lines should be laid down as to the course that should be followed out. Dr. Whitman, an authority on the subject, sums up what they have learned—isolate the case, give courses of educational treatment and follow up closely; beware of early massage; electricity is not used.

